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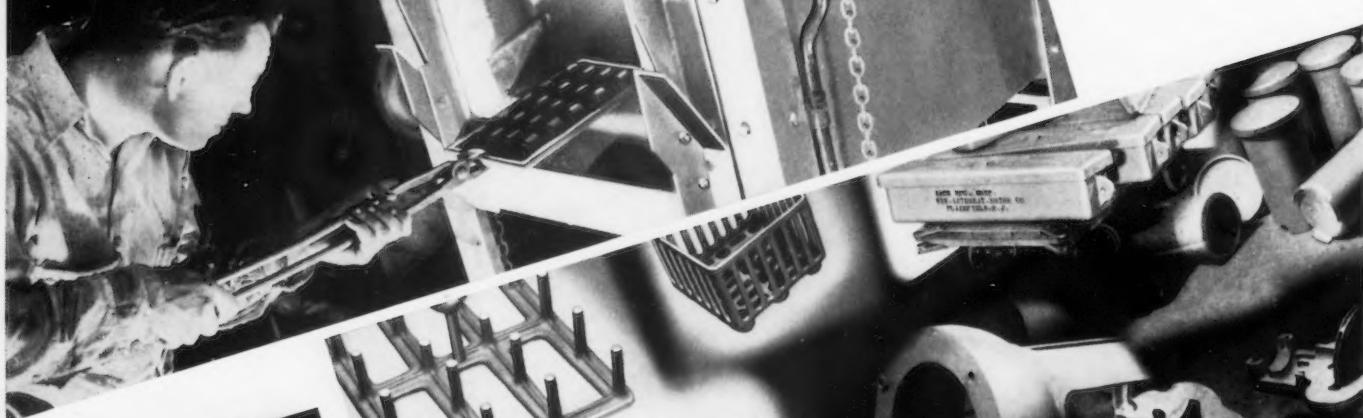
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APRIL 24, 1941

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The Iron Age

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APRIL 24, 1941

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1855



Ceiling or Coffin Lid?

"I SEE by the papers," as Mr. Dooley would say, that the boys in Washington have put a ceiling on steel prices and raised the lid on coal.

Ceiling and lid are two different words, but broadly speaking, they perform the same function. So far as the man in the pine box is concerned, his ceiling is the coffin lid. It provides an effective stopper to further activities, even though perchance the coroner and the doctor had erred and buried him alive.

Even when you put a ceiling on a workroom in which people are supposed to work, you have to be careful to make it high enough to let them breathe. Otherwise it actually becomes a coffin lid.

And you have to take into account that some people require more air than others in order to keep from suffocating. Some of the strong boys even survived the Black Hole of Calcutta.

The trouble with price ceilings is that they are not designed to fit the individual. They are supposedly designed to fit the average. And averages are very deceptive.

Let us say that we are to design a ceiling for 100 men whose average height is five ft. six. So we make it at a height of five ft. nine, which theoretically would give everybody three inches of clearance. But as it happens, 50 of these men are six feet tall and the other half five feet. So half of them, theory or no theory, are bound to have pains in their necks.

This theory of averages is just as fallacious in setting price ceilings. In every industry, steel notably included, the efficiency of production varies throughout the industry. There will be some low cost producers at the top, some high cost producers at the bottom and a varying strata in between. No two are exactly matched, due to differences in location, in managerial talent, in their command of capital, in degree of mechanization and in volume.

As a rule, if rule there be, you can take it that the larger units in an industry are most favorably placed from the cost of production standpoint. The smaller ones are the boys who are usually "out on a limb."

Many of these weaker and smaller units are performing a valuable service. Some of them make specialties that are not made by the big companies. None of them have turned in excessive profits even before the wage rise. And all of them are going to have "pains in their necks," or worse, under this new steel price ceiling.

If we want to drive these smaller units out of business and make the larger units still larger, this is the way to do it. But it is not what I would call the "American" way. After all, America is a big hearted country. We are willing to finance, arm and feed most of the nations of the world at a cost of uncounted billions. Why starve our smaller steel producers at home?

J. H. H. H. H. H.



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Jominy Test of Meehanite

By A. C. DENISON

Fulton Foundry & Machine Co., Inc.

—Originally employed to determine the hardening characteristics of tool steels, the Jominy test is now being experimentally used to ascertain the best type of heat treated Meehanite for various applications. This article describes the tests and the results obtained.

AS a routine laboratory test of steels that are to be hardened, the Jominy test has been helpful in determining the hardening characteristics of tool steels, thus enabling the selection of the correct steel from both cost and operating standpoints. The test has been so successful in that application that it was decided to run some tests on Meehanite to determine the best types for various applications which required heat treated Meehanite.

The Jominy test is based on the principle of "end quenching," whereby a sample 1 in. in diameter and 2¾ in. long is quenched by striking it with a stream of water on the lower end when the specimen is set vertically. This will produce rapid cooling on the side near the lower end with progressively slower rates of cooling at increasing distances measured along the side away from the lower end. Consequently, if the reaction rate is fast, high hardness will exist only near the lower end, but as the reaction rate of the material is slower this high hardness will prevail at greater and greater distances away from this lower end against which

the water is projected. As a matter of standardization the water is projected through a ½-in. pipe at a velocity which will raise the water as a fountain 2½ in. high. The specimen is held rigidly in the center of this fountain ½ in. above the water outlet. The temperature of the water approximates 75 deg. F. The apparatus consists of a water tank rigged with a motor driven pump with piping and valves for controlling the flow of water, and over the top of the tank is constructed a fixture for holding the specimen for quenching, as illustrated in the picture of the machine (Fig. 1), with the test specimen in place. A sketch of the machine (Fig. 2), which was built by the Fulton Foundry & Machine Co., Inc., gives details of the apparatus.

It was suggested that a few preliminary hardenability tests on a Jominy apparatus be tried, and this was done. Knowing the effect of manganese in delaying reaction rates and bearing in mind that "GM" Meehanite is finding extensive application in the heavier castings subjected to severe and excessive stresses particularly if they are to be heat treated, it was de-

cided to run tests on both "GA" and "GM" Meehanite for comparative purposes.

Fig. 3 was developed from these preliminary tests. These curves show a few interesting things:

(1) Curves for specimen 1.21 per cent manganese and 0.85 per cent manganese are about the same even though the silicon content of the 1.21 per cent manganese specimen is considerably lower than the other specimens, which it was always thought should react favorably to help hardenability.

(2) Even though the silicon is high the specimen with 1.60 per cent manganese showed a tremendously improved hardenability reaction. This is very significant and should be remembered when considering other curves presented in this paper.

In other researches the relation of cooling rates of bars of various diameters, as compared with the cooling rate of Jominy specimen at varying distances from the quenched lower end, had been worked out by the investigators sponsoring these tests. This creates a practical aspect for these Jominy

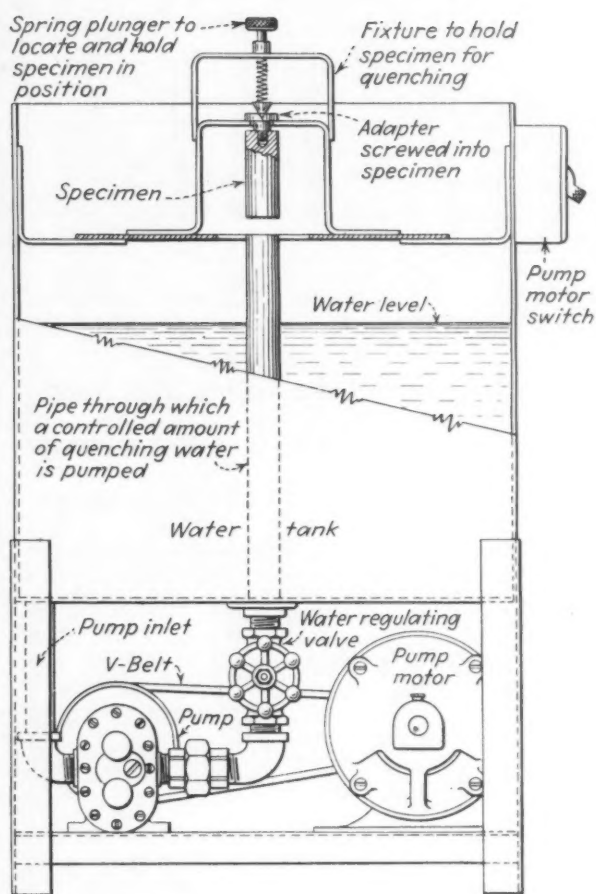


FIG. 1—Jominy testing machine used in these experiments. This equipment was built by Fulton Foundry & Machine Co., Inc.

AT RIGHT
FIG. 2—Test piece set-up in the electric furnace. The tubing is put around the specimen to protect it from atmospheric conditions. Also, the graphite flake pack, small tray and carbon block at the bottom seals the specimen against entrance of air.

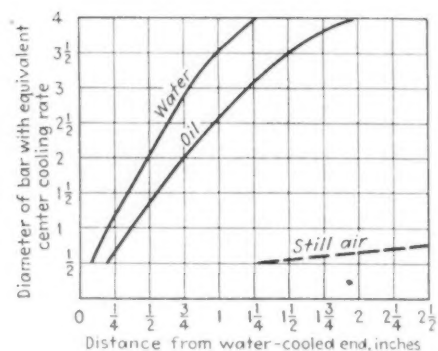
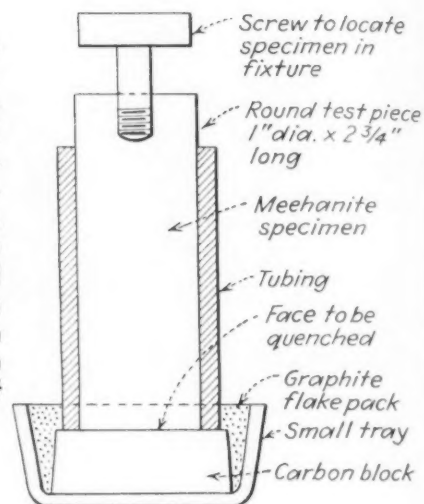


FIG. 4—Relation of cooling rates of bars of various diameters, as compared with the cooling rate of the Jominy specimen at varying distances from the quenched lower end.

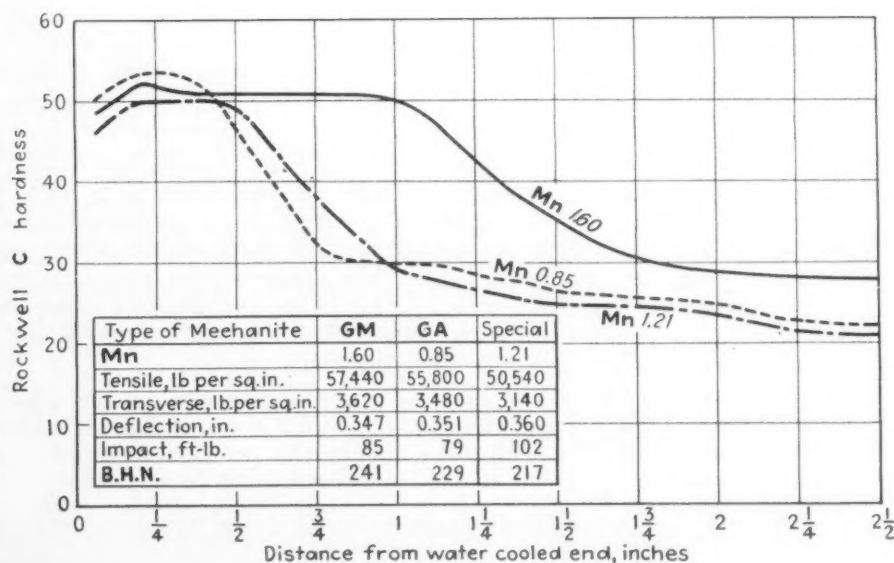


FIG. 3—Results of a few preliminary hardenability tests. Each of the three specimens was heated for 1/2 hr. at 1600 deg. F.

curves, and the curves are given in Fig. 4.

An interpretation or use of the curves shown in Figs. 3 and 4 would be as follows: Suppose a specimen 1 in. in diameter on oil quench is being considered—Fig. 4 shows the cooling rate of the specimen to be the same as $\frac{3}{8}$ in. from the quenched end of the Jominy test bar, so that by referring to the Jominy curve in Fig. 3 it is apparent that $\frac{3}{8}$ in. from the end gives a hardness of over 50 Rockwell C on all three samples. Therefore, the 1-in. piece will harden nicely. But following through a 2-in. specimen, it is apparent that the cooling equivalent is $\frac{3}{4}$ in. on oil quench, so that on the lower manganese specimens the quench will produce only about 35 Rockwell C hardness while on the high 1.60 per cent manganese specimen it is possible to get over 50 Rockwell C hardness.

This shows a practical value to these curves for hardness cycle determination, because this same 2-in. specimen has a cooling equivalent on a water quench of $\frac{1}{2}$ in. from the quenched end of the Jominy bar which then would give satisfactory hardness on all three specimens with the three different manganese contents, as shown in the curves of Fig. 3. Thus, there is a hardenability relation both from composition (with variations of manganese being of primary importance) and speed of quench (whether water or oil), and this relation is set up on an informative data basis.

It might also be mentioned that it is possible to reflect back to past work at the Fulton Foundry & Machine Co. and find that practical experiences on quenching and heat treatment have just about checked with the findings shown by these curves. This also explains the necessity to use good judgment with time quenching and variations of draw to get satisfactory results. This was thought strange at the time, but the results would have been properly expected had the equivalents disclosed by these tests and curves been known.

With these preliminary results showing up so interestingly, it was decided to enlarge the research and try to determine:

- (1) The effect of quenching temperature on hardenability.
- (2) The effect of soaking time sensitivity on hardenability.

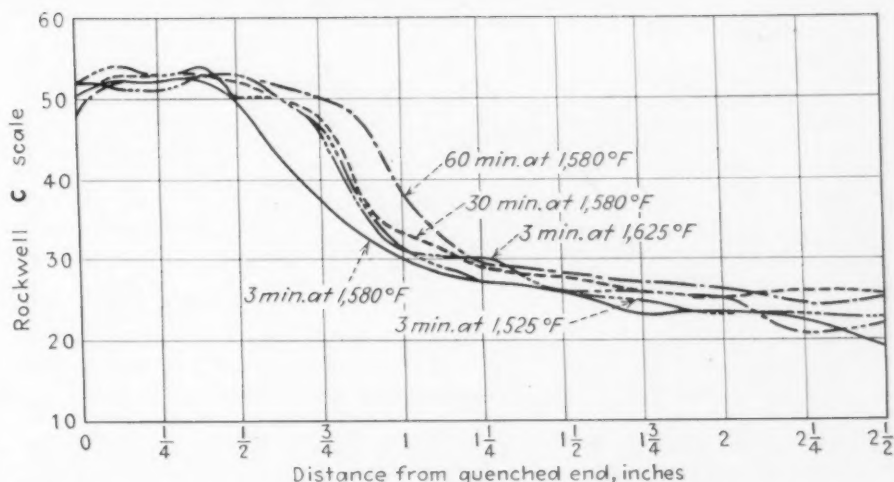


FIG. 5—Five series of tests were made on "GA" Meehanite of different compositions and the curves all have the same trend. They show, (1) reasonable soaking was not harmful, (2) with manganese high a reasonable soak was desirable so as to get good austenite for quenching, (3) 1580 deg. F. would be a good quenching temperature to use generally in the remainder of the research.

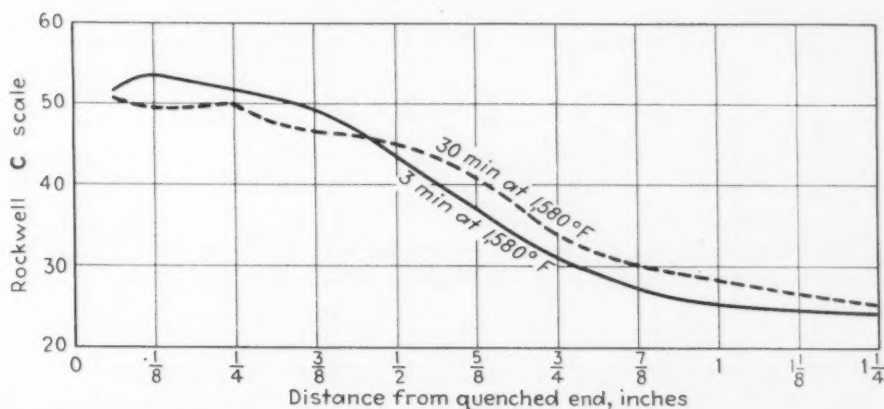


FIG. 6—This "GA" (1.24 Mn) Meehanite is about normal. Here it is shown quenched from 1580 deg. F. after 3 and 30-min. soaks. These results appear satisfactory, and the same cycle is used for 12 other curves covering other specimens.

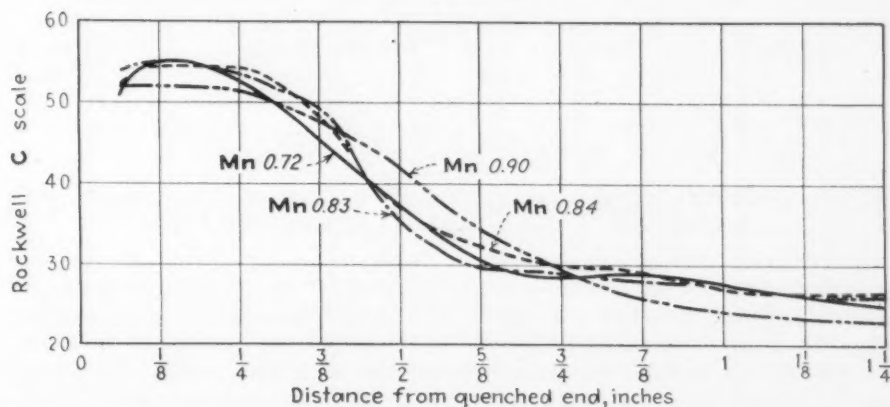


FIG. 7—Four specimens of Meehanite tested, each soaked for 30 min. at 1580 deg. F. The manganese percentages here are fairly close.

(3) The effect of composition variations on hardenability.

(4) The effect of Meehanite treatment on hardenability.

(5) Anything else that might be disclosed while running these tests.

For this work, a number of spe-

cial samples were poured, and also eleven others were obtained from various Meehanite foundries.

A series of specimens was run to quench from 1525 deg. F., 1580 deg. F., and 1625 deg. F., and soaking periods varying from 3 min. to

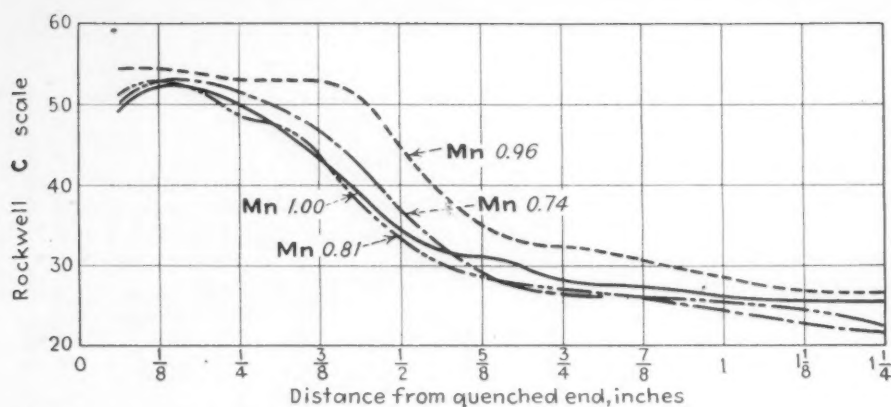


FIG. 8—Tests on four types of Meehanite, the manganese percentages being different from those in Fig. 7. A 30-min. soak at 1580 deg. was used.

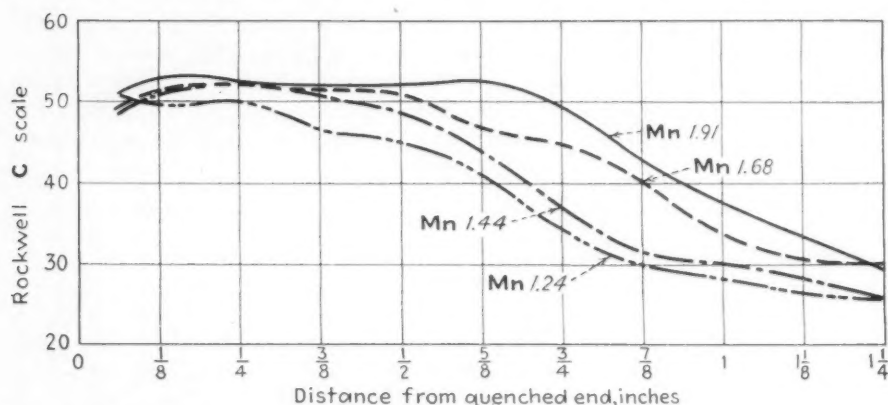


FIG. 9—Jominy test on Meehanite with higher manganese content. As in Figs. 7 and 8, a 30-min. soak at 1580 deg. F. was used.

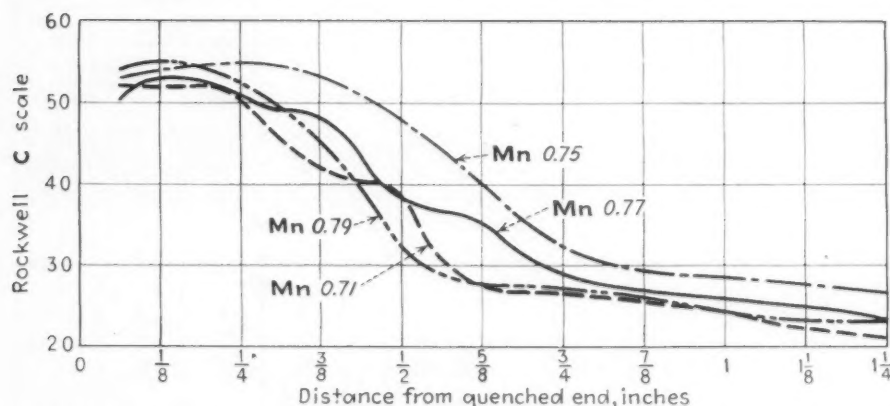


FIG. 10—Jominy test of Meehanite with a lower range of manganese. As in other tests, a 30-min. soak at 1580 deg. F. was used.

1 hr. were used at the intermediate 1580 deg. F. temperature, all with the idea of getting some light on the importance of temperature and soaking time as a factor in this research. The curves in Figs. 5 and 6 are self explanatory.

The curves shown in Figs. 5 and 6 take in only a small practical range of temperature soak. To get really extended data would require a further research beyond the scope of this preliminary investigation. This may be done later. But the tests made indicated Meehanite suitable for normal heat

treatment is not unduly sensitive to breakdown on reasonable soaking periods and not nearly as sensitive as many other irons. Therefore, for the balance of this investigation, it was determined to use 30-min. soak periods at 1580 deg. F. and, where permissible, to check this with 3-min. soak periods at the same temperature.

As this investigation constitutes the first work of this kind, we were not able to cover this subject completely and intend to continue investigations along this line using new equipment and many new spec-

imens. However, the specimens collected for this research had many analytical variations, and some preliminary trends could be determined by grouping them and plotting Jominy curves and analyzing these hardenability curves.

For this check the Jominy curves made on specimens soaked 30 min. at 1580 deg. F. are used, and as the tests indicated that manganese was apparently the element requiring control, four curves are grouped together in sets where the manganese percentage was closely the same. Sixteen specimens are covered by this series. See the curves shown in Figs. 7, 8, 9 and 10.

There is difficulty in drawing definite conclusions from these curves because in most cases more than one factor is influencing them, but some trends are evident:

(1) There is not much difference between the curves of Fig. 7 and Fig. 10. Then, too, in some instances there is not much difference in total carbon, manganese, and Meehanite treatment. But the silicon analysis varies quite widely from 1.0 per cent to 1.7 per cent, which would indicate that at least in the lower ranges the percentage of silicon has not much effect on the reaction rate to influence hardenability.

(2) Again, observing the groups of curves in Figs. 7 to 10, it is to be noted that some specimens are "GA" Meehanite and some are "GB" Meehanite, yet the Jominy hardenability curves are about the same. This would indicate that in general there is little if any difference in the hardenability properties of a "GA" Meehanite and a "GB" Meehanite providing "GB" is made as specified in Meehanite instructions.

(3) Fig. 9 shows a high manganese series, and it takes only a glance to see that manganese is a potent element to delay the reaction rate and increase hardenability. Also, that while increased percentages of manganese probably do continue to improve hardenability yet a practical percentage seems to be around 1.50 per cent, which on reference to the curve for cooling equivalents would give good hardenability on oil quench in about 1 1/2 in. sections and on water quench 2 in. to 2 1/2 in. sections. Likewise, when it is considered how very potent manganese is in delaying the reaction rate it would seem that chromium here had a lesser

effect and may not be so effective in influencing hardenability. It is believed that it is better to use manganese than chromium to produce hardenability because it also produces tougher and more machinable castings. In other words, it is believed that these curves favor manganese rather than chromium as a hardener when considered from every standpoint. However, there is doubtless room for more investigation on the effect of chromium, especially for heavier section work where moderate percentages do not harm the pearlitic structure of Meehanite. The plan is to check this by further investigation.

From the various charts which have been shown in this paper, it can be readily concluded that within certain limits silicon content has very little or no effect on the hardening qualities of Meehanite. Also total carbon, within certain ranges, has little effect on the reaction rates

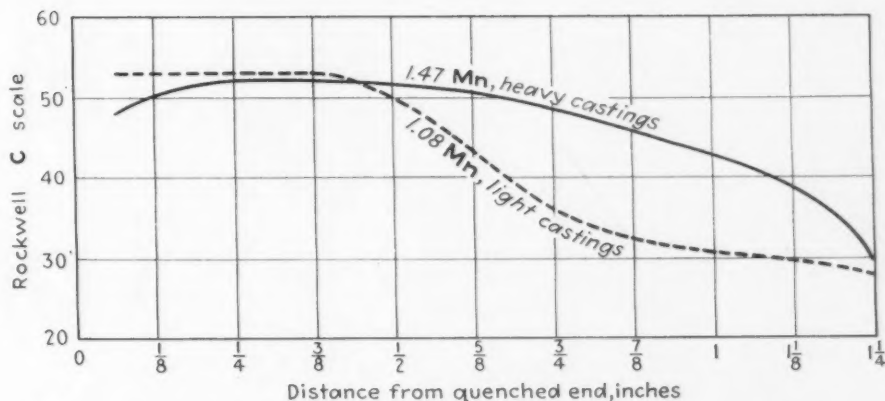


FIG. 11—Jominy curves for an improved Meehanite, made at the plant of Fulton Foundry & Machine Co., as the result of this research.

in cooling. Manganese greatly affects the reaction rates, and if light section castings are to be hardened, it can be done even though the castings contain only the normal amounts of manganese. If a casting has exceedingly heavy

sections and it is desired to have a high hardness penetration value in these sections, it will be necessary to adjust the manganese so as to retard the reaction rates accordingly. The results of such an adjustment are shown in Fig. 11.

Determining Nitrogen Content in Alloys

IT has been observed that considerable differences frequently occur in the nitrogen determinations of the same steel when carried out in different laboratories, according to G. Phragmén and R. Treje, in *Jernkontorets Annaler*, 1940, vol. 124, No. 9.

According to a translation by the Iron and Steel Institute (British), the authors have, therefore, investigated the accuracy of a number of different methods, and they survey the literature on the subject and report on some of the results

obtained in their laboratory work. Determinations can easily be made with unalloyed steels by dissolving the sample in a dilute acid which converts the nitrogen into an ammonium salt; but with alloy steels difficulties arise owing to nitrogen being retained in the undissolved residue. A number of methods of treating the residue were examined. These included filtering it on asbestos, drying at about 100 deg. C., and dissolving the residue either in sulphuric acid with a sulphate addition, or in perchloric acid with

an addition of sulphuric acid, or alternatively by oxidation with sodium peroxide by Klinger's method.

The authors found that in most cases the results were in fairly good agreement. In their opinion the method using sulphuric acid with a sulphate addition is a simple and reliable one. A comprehensive table, in which the nitrogen determinations for a large number of alloy steels are compared, is presented, and a bibliography is appended.

Preventing Corrosion Cracks in Boiler Steel

THE causes of the formation of cracks in boiler steel, with particular reference to the investigation of the failure of the shell plate of the upper dome of a marine boiler, were discussed by G. Wallgren in *Teknisk Tidskrift* (Swedish), 1940, vol. 70, Oct. 19.

According to a translation of the Iron and Steel Institute (British), the author differentiates between fatigue cracks without corrosion, inter-crystalline cracks caused by caustic embrittlement, and corrosion-fatigue cracks. Specimens of the boiler plate taken from positions close to, and away from, the

cracks and etched by Fry's method revealed slip lines at angles of about 45 deg. to the surface of the plate. The cracks were, however, found to be at an angle of about 90 deg. to the surface. The cracks passed partly along grain boundaries and partly through the grains.

In discussing whether stress is the primary cause of crack formation in boiler plate, the author states that this is the case only when the slip lines are so marked as to have been caused by stresses up to the elastic limit of the steel. He is of the opinion that corrosion-

fatigue cracks can also form and grow in regions where there are no slip lines but where there are high stresses less than the elastic limit. A steel can be cold worked without any slip lines appearing and such a region is very sensitive to corrosion. Another point which supports the theory that slip lines are not the primary cause of corrosion cracks is the fact that those parts of a boiler which are cold worked during erection to the extent that slip lines occur, but which are not heavily stressed when the boiler is at pressure, have no tendency to the formation of corrosion cracks.



FIG. 1—Close pitch (left) flexible metal hose; and normal pitch (right) flexible metal hose.

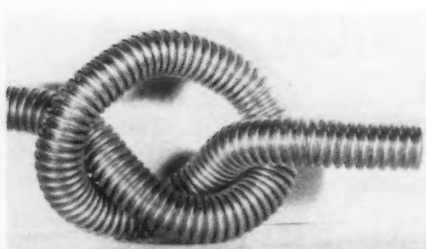


FIG. 2—Seamless monel metal tubing is almost as flexible as rubber tubing.

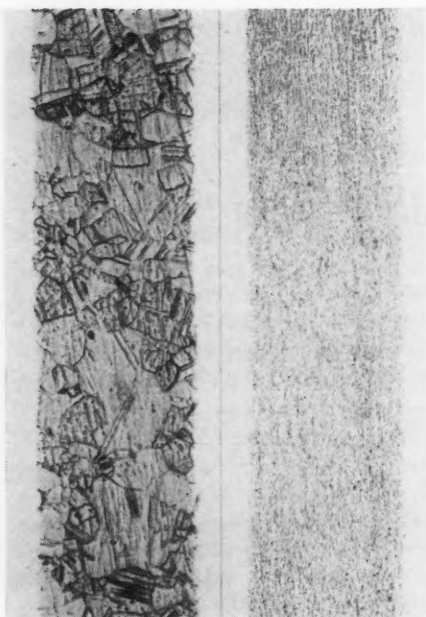


FIG. 3—Microstructure of monel metal tubing, as-received (left) and as-drawn (right).

Flexible Metal Tubing

—The metallurgy of the steels used, the drawing and corrugating equipment employed, etc.

By R. J. METZLER

*Metallurgist, Eclipse Aviation Division,
Bendix Aviation Corp.*

FLEXIBLE metal hose combines the characteristics of metal with the flexibility of rubber. The type of metal hose discussed in this article is made from thin-walled seamless metal tubing.*

In the East Orange, N. J., plant of the Eclipse Aviation Division, Bendix Aviation Corp., flexible metal hose is produced in six non-ferrous and two ferrous alloys. These alloys include 3 per cent silicon bronze, 85-15 brass, 70-30 cupro-nickel, 80-20 cupro-nickel, pure silver, monel metal, aluminum, nickel, stainless steel and low-carbon steel.

The seamless tubing is formed into flexible hose in sizes ranging from $\frac{1}{8}$ in. to $2\frac{1}{2}$ in. inside diameter. Larger sizes are available in a spirally corrugated, heavy walled hose for applications where the flexibility, to a large degree, is sacrificed for high strength.

The flexible hose can be furnished in two forms, namely, close and normal pitch (see Fig. 1). For high strength and medium flexibility in a thin wall material the close pitch hose is used. Where high flexibility and average strength is required the normal pitch hose is specified.

* For production of stainless steel flexible hose from welded tubing, see *The Iron Age*, Aug. 17, 1939, p. 46-48.

To produce a hose made from metal which has some of the attributes of rubber (Fig. 2), a close metallurgical supervision is necessary. Rigid specifications covering the purchase of the raw material have been drawn up by the metallurgical department in cooperation with the production department. These specifications cover close chemical composition ranges, size tolerances, surface finish requirements and a definite grain size in the as-received condition. The last mentioned item is the most important one of all from a production standpoint.

Each shipment of raw material is carefully inspected visually, checked for dimensions and sampled for metallurgical examination. It must pass each and all of these examinations and its failure in any one would cause rejection.

The raw tubing which has passed these tests is drawn cold, in one pass, to approximately one-third of its original wall thickness and three-fourths of its original diameter. Since the tubing is given this drastic draw, the reason for the close inspection of the raw material is quite obvious, as any slight seam or hair line in the raw tubing will be drawn to three or four times its original length. Since in the drawn tube the wall thickness

is greatly reduced, the seams or hairlines may cause a faulty tube either to split during the drawing operation or else to result in a finished product with an undesirable weakness. The effect of this cold drawing operation on the original grain size may be seen on the photomicrographs of the raw and drawn tubing (Fig. 3).

The drawing operation is performed on a draw bench which has

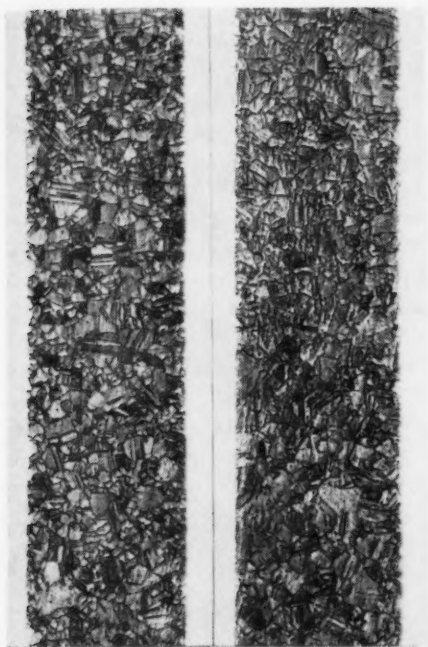


FIG. 5—Microstructure of silicon bronze (left) and monel metal (right) hose after drawing and re-annealing.

rotating steel balls in the die head instead of the solid type die head. A beveled, plug type mandrel is used to aid the balls in performing the drawing operation. While the mandrel is maintaining the inside dimension, the rotating balls, operating at high speed, work the wall and outside diameters to the finished dimensions. Although the operation resembles swaging, the drawn tube has a smooth, even, and bright surface finish. An automatically operated draw bench, which requires only the insertion of the tube, pulls the raw tube through the drawing head. Upon completion of the draw on a length of the raw tubing, the pulling mechanism releases itself, and the drawn tube is deposited in a trough alongside the bench.

In this type of drawing, a water soluble drawing compound was

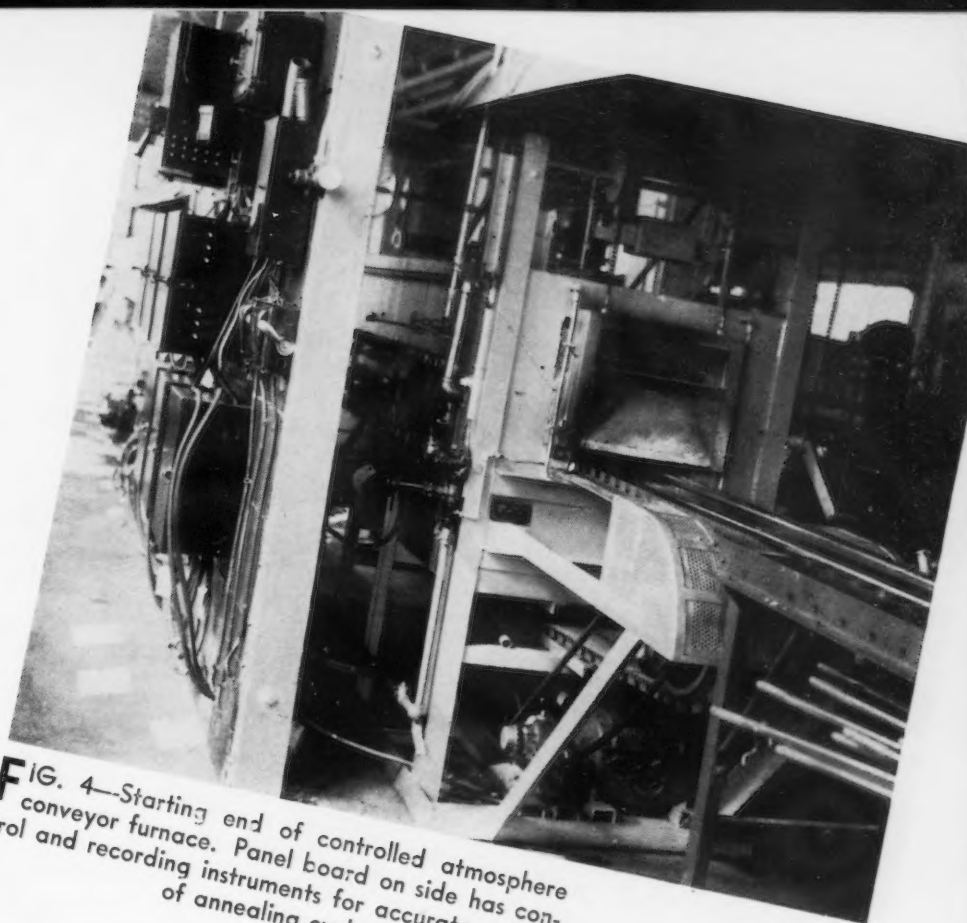


FIG. 4—Starting end of controlled atmosphere conveyor furnace. Panel board on side has control and recording instruments for accurate control of annealing cycle.

FIG. 6—Corrugating machine, showing the four forward fingers which hold the tube while the loop is formed by the rear fingers.



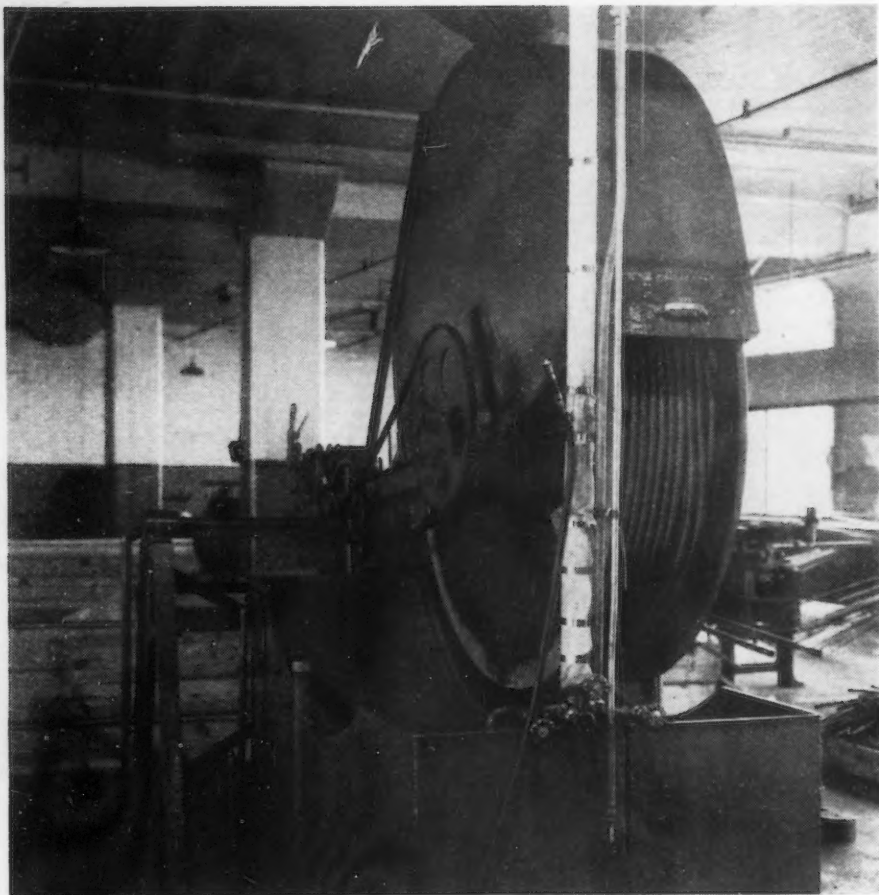


FIG. 7—Washing machine, showing two tanks. One tank contains solvent and the other contains boiling water. The drum is revolved mechanically in each tank in turn.

found to give the best results. On the other hand, the corrugating operation which is a less drastic cold working process, requires an extra heavy machine oil as a lubricant.

To make this drawn tubing suitable for the corrugating operation a recrystallizing anneal is necessary. This annealing operation is accomplished in a Hayes bright annealing conveyor furnace (see Fig. 4). Each length of tubing must be annealed in this controlled atmosphere furnace since the drawn tubing must be free of scale for the next operation. In order to attain the scale-free surface condition, a series of gas atmospheres was developed for each different alloy. These atmospheres are produced by cracking city gas in the presence of air and introducing the product into the heating chamber of the furnace. The natural air is excluded from the open conveyor door by a flame curtain. Various alloys, of course, require different temperatures and times at temperature. These variables had to be put on a ratio with the controlled atmosphere in order

to obtain the best surface finish. The results of the annealing are shown in the photomicrographs (Fig. 5).

The corrugating operation is entirely automatic. An annealed length of tubing is placed in the machine at one end and each set of forming fingers moves the material forward producing the finished product at the opposite end. The fingers are arranged in two sets, one, the gripping and holding set, and the other, the forming set. Since the corrugation itself is actually an easy loop, the rear set of fingers pushes forward while the front set holds and the loop is formed. This operation reduces the length of the tube approximately 75 per cent, namely, four to one ratio. A view of this machine is shown in Fig. 6.

In a properly annealed tubing the above operation is readily performed and only a small amount of cold work strain is introduced. This strain is subsequently relieved by a low temperature anneal in the bright annealing atmosphere control furnace. There is no change

in grain size in the corrugating operation and therefore no change need be obtained in the light anneal.

The grain size of the tubing affects the corrugating operation, only from the standpoint of the hardness of the metal. To perform this operation the grain size of most materials may be as low as 0.025 mm. minimum without causing any difficulty in forming the corrugations. For monel metal, nickel, stainless steel and similar high work-hardening alloys the grain size must be kept above 0.045 mm. or else serious tool trouble will develop. If the metal is too hard to form, the fingers will not complete the operation, producing, instead of a round tube, one with a hexagonal inside diameter. This condition serves as a warning and helps preserve tool life since continued operation using the hard material will show considerable tool wear which produces an undesirable surface finish on the hose. The presence of heat treating scale on the tubing will cause the same tool wear with its resulting poor surface finish. This is one of the main advantages of the controlled atmosphere furnace.

For the fingers or actual working tools, a nitrided high speed steel is used where the softer alloys are to be worked. Monel metal, nickel and stainless steel, however, require chromium plated hardened tool steel fingers both for wear resistance and for low coefficient of friction.

All grades of the corrugated material are then washed in the rotary washer shown in Fig. 7. This washer consists of a rinse in a solvent to remove the heavy grease and then a boiling hot water rinse to remove the solvent. Each length of flexible hose is then tested with air or hydraulic pressure to detect any small pin holes or defects which may have opened up during the drawing or corrugating. To pass this inspection the tubing must withstand a pressure of 1000 lb. per sq. in.

The larger sizes of thin walled flexible hose are often used as the inner portion of water jacketed exhaust connections. Frequently these connectors are covered with a protective braid which is brazed to the outer portion of the connector nipple. This braid affords additional protection and increases

the flexing strength of the completed product.

Special stress relief annealing treatments are given to flexible hose to dampen vibration. This special type of anneal was developed primarily for hose to be used on air conditioning units where the vibration frequency was high but where the resulting noise must be eliminated.

Special applications of flexible hose are too numerous to mention in detail. However, other applications in addition to those already mentioned include: carrying oil for hydraulic systems under high pressure, carrying lubricating oil to

moving machinery parts, carrying high pressure steam and corrosive chemicals, connections to isolate vibrations, oil burner feed lines, and so forth.

The individual alloys, however, have their own particular field of usefulness. Silicon bronze is widely used for oil burner connections and for conducting Freon and other refrigerants. Flexible tubing made from monel metal is used for high pressure, superheated steam, corrosive chemicals and where strength is a controlling factor. Aviation applications create the largest demand for the aluminum alloy hose since weight is invariably the

major consideration. Saturated steam under pressures up to 250 lb. per sq. in. may be carried in hose made of 85-15 brass.

Although flexible hose can be produced from a wide range of materials, individual applications frequently require special alloys. Therefore, while they may not be a regular production item, alloys in addition to those previously mentioned are made to the customer's requirements.

For transporting most liquids, vapors or semi-solids, it is most likely that there is an alloy and a connection which can be made in flexible metal tubing.

Tin Hats Require Many Operations

THE simple lines of the finished "tin derby" of the style used by the United States and British armies (see accompanying illustration, courtesy Modern Industrial Press), belie the many steps involved which, from steel stock to final wearing, consist of blanking, drawing, annealing and pickling; followed by stamping, trimming and the edging operation which includes spot welding; then, the piercing of a small vent in the dome for ventilation; the attaching of spring clips, painting and baking. The few final steps are fitting the helmet with a sweat band and chin strap. Naturally, the more elaborate helmets favored in some countries, with deep crowns and hemmed rims, require several additional redrawing, restamping and annealing operations, according to the Vanadium Corp. of America.

While the chief purpose of the trench helmet is the obvious one of protecting the wearer's head against bullets and shell fragments, it is equally important that an army in the field or a corps of firemen chasing incendiary bombs be not burdened with a helmet that is inconvenient to wear regardless of

the season—in rain, or snow or beneath a hot summer sun.

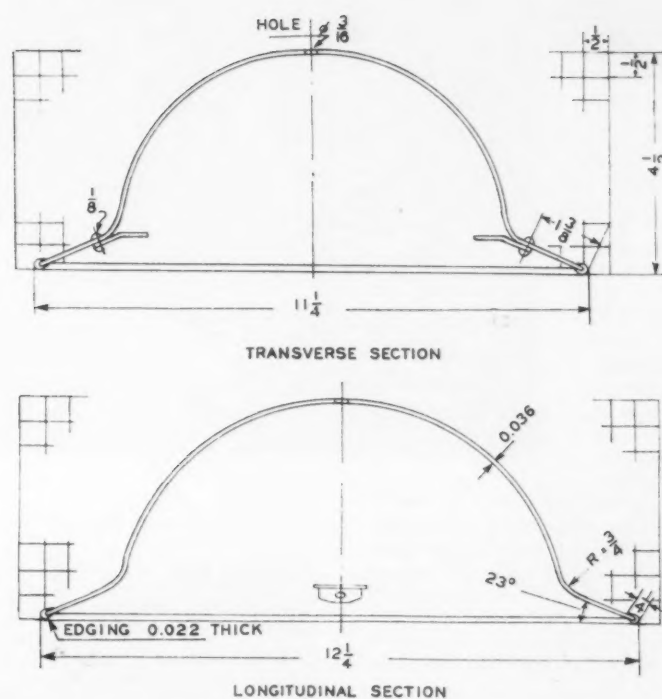
That's why military authorities have emphasized the need for a relatively light helmet weighing between 1 lb. 9 oz. and 1 lb. 10 oz. Yet the material from which it is made must be strong and tough enough not to break or split under the impact of a shell fragment returning to earth nearly as fast as the original shell left the gun barrel.

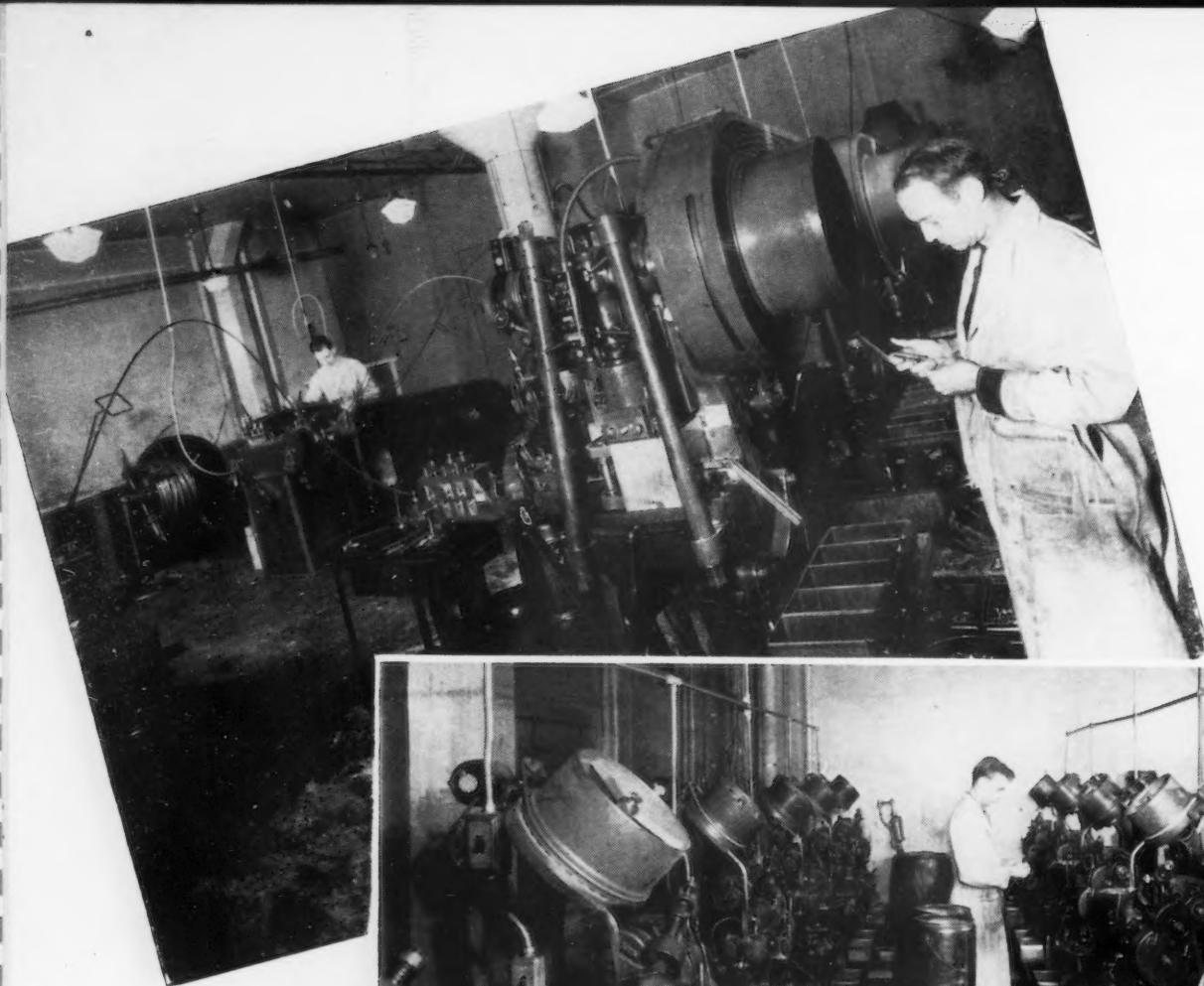
The following table lists the chemical composition of some steels

which have been used by various armies:

Composition	No. 1	No. 2	No. 3
Carbon	1.41	0.37	0.30—0.40
Manganese	13.353	0.35	0.60—0.90
Silicon	0.228	...	1.75—2.50
Nickel	...	3.30	2.00—2.50
Chromium	...	1.15	...
Vanadium	...	0.20	...
Molybdenum	...	0.35	...

Before the finished trench helmets are issued to the wearers, a thorough test is usually required. Samples chosen at random from each lot are subjected to severe firing tests which are equivalent to the punishment encountered under fire.





ABOVE
SPECIALLY designed high-speed power presses, automatically fed, and forming 600 special nuts per minute. Attached to the side of the press is a specially designed roller and grip-type feeder. In advance of this is the loop of drawn bar stock passing through the upraised control arm that controls the feeding of the automatic straightener. The straightener is supplied from a coil of material as shown in the background. The material is straightened in both horizontal and vertical planes, and over-feeds the mechanical feeder and press to provide against any dragging tension that would interfere with accuracy of the press cut-off.

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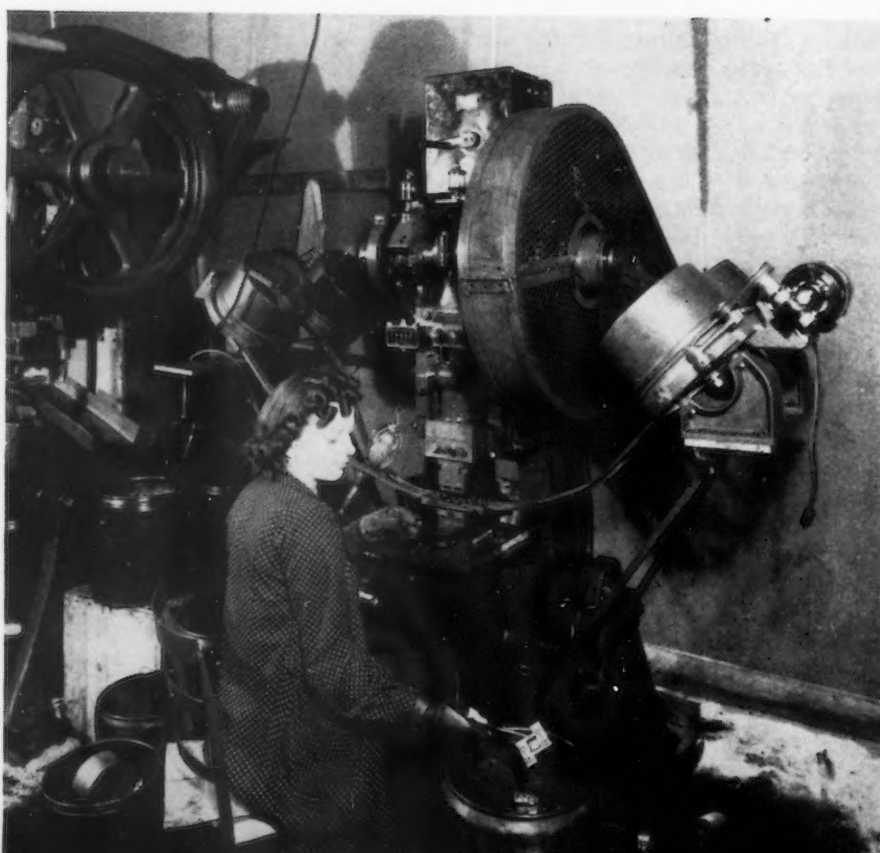
ABOVE

ELEVEN automatic tappers put the finishing operation on the nut. Each tapper is equipped with a rotary hopper, belt-driven by individual electric motors. These hoppers, designed by the users, are also incorporated in special swaging machines or presses for installing the nuts.

o o o

RIGHT

AN automobile door striker plate requiring the installation of four nuts is shown here after removal from the swaging operation. Four rotary hoppers feed Fabristeel nuts through semi-closed channels to proper position on the anvil. The operator places the striker plate stamping in position for the swaging blow.



On Nuts

By W. F. SHERMAN
Detroit Editor, *The Iron Age*

—Clinch nuts for rapid sheet metal assembly made continuously from cold drawn steel at the rate of 750,000 per 8-hr. day

PRODUCTION of special nuts from coils of steel stock by continuous, automatic methods in three-stage progressive dies at the rate of 600 per min. is being accomplished by FabriSteel Products, Inc., Detroit. This plant, with three production units, is turning out in excess of three-quarter million special nuts every 8-hr. day.

The product is the Fast-On lock (clinch) nut used widely for sheet metal assembly. Its appearance is that of a square nut on top of a rectangular nut. It is made from a flanged section, cold drawn SAE 1112 steel.

Manufacturing equipment is special in nature—from the automatic straighteners with automatic tensioning control, through the mechanical feeder, the dies, and the ultra high speed power presses. Three such presses operate in conjunction with a battery of 11 automatic tappers equipped with rotary

hoppers and special tools designed by the user.

Each automatic straightener includes both horizontal and vertical sets of rolls, necessary because the rapid press action requires accurate, smooth feed. The straightener over-feeds its press slightly, so the mechanical feeder does not have to pull excessively hard. This avoids inaccuracies in feeding, and contributes to accuracy of the finished nut, which is held within a 0.003-in. tolerance on cut-off length. Over-feeding by the straightener is controlled by a long hooked arm which is carried up by the loop of excess material between the rollers and the press; when the loop reaches a predetermined height, the arm trips a mercury switch, stopping the straightener until more material is needed.

The mechanical feeder, built to FabriSteel specifications, is mounted at the press and slides forward

enough material for two nuts at each stroke of the press. This feed is accurate, to control the width of each nut, and is synchronized with the fast-acting press.

The die is simple, without spring-actuated strippers or moveable parts; actually it is little more than a holder and guide for the material, and an anvil. This simplicity is probably the main reason for its success under the high-speed piercing and cut off blows from the press. However, the progressive die action is unusual in that it permits piercing and cutting off pairs of nuts simultaneously so every stroke of the press, after the initial ones, is effective and two nuts are produced at once.

After cut off, the nuts drop down chutes to containers below the press. The velocity of the out-coming nuts is so great that they would rebound to the ceiling of the press room, except that the chutes are baffled.

The presses, two 25-ton and one 35-ton, are a type that ordinarily run at approximately 100 strokes per min. These are specially designed to operate 500 strokes per min., actually perform at 300 day in and day out. Somewhat heavier than conventional equipment, and equipped with special bearings and a pressure lubrication system, they are built with heavy duty disk type clutch controlled electrically.

Various methods of installing these clinch nuts are employed, depending upon production requirements—ranging from hand swaging to the use of automatic machine equipment. (See accompanying photographs.



THE small (square) portion of the nut is inserted in a punched square hole, protruding just enough for the four corners to be clinched with a swaging tool.

Economic Factors in

IT must be kept in mind that in structural welding, where welding is done both in shop and field, many factors enter into the cost and that, therefore, the economy of welded construction depends not only on the process itself but upon the methods of fabrication, handling in shop and field; these in turn depending on equipment and personnel available.

Just as in riveted construction, a shop equipped with spacers, edge planers, gang drills, etc., and with a force of men accustomed to use those machines effectively will use different methods of fabrication from another structural shop equipped only with shears, single punches and drills and a rudimentary riveting outfit. Similarly, a shop well equipped with transfer cranes, with jibs or gentries to handle and turn the work over and with a personnel experienced in arc welding and automobile flame-cutting will handle work quite differently from a shop less completely equipped and obliged to expand its welding staff every time it faces a job above average size.

One shop, for example, will cut plates with a shear while another one cuts them with a flame-cutter; one shop will true the edge or web

plates with an edge planer while another will use a fillet weld and a grinder to bring the edges flush after assembly with the top or bottom flange angles.

Fig. 1 shows a section through a riveted girder in which it is desired that the web bear intimately against the top cover plate. This girder may be a building girder carrying a very heavy distributed load or several columns; it may be a heavy crane girder in a factory or a railroad deck girder. It is realized, of course, that sheared plate edges are not true enough to give a solid, dependable bearing edge. As a consequence, in riveted practice, such plates are set back from the back of the flange angles as illustrated for the bottom flange. A shop with an edge planer may elect to set one edge of the web plate against the planer and machine it true. Then the girder will be assembled upside down (Fig. 2), with the top flange on the shop floor and the machined edge of the web bearing on the flange plate. The angles, first assembled to the web, will now be tack-welded to the flange, after which the assembly will be taken to the riveters.

Another shop will accomplish the same result by assembling the top

flange angles to the flange (Fig. 3), riveting them together, then arc welding the gap between the back of the angles and grinding the top of the weld flush with the back of the angles after which the top flange plate will be assembled to the angles in the usual way.

It should be noted that if there are only a few spots in the length of the girder where bearing of the web against the under side of the top flange plate is necessary—such as under columns resting on the girder—there is no advantage in planing the full length of the web. Similarly, if only a few girders are involved, it would likely be cheaper to use welding and grinding than to set up a large planer to do the work.

It follows that cost comparisons between various means and methods of fabrication depend upon the set-up of the individual shop. In making cost comparisons, plant operators should make themselves familiar with all the advantages of arc welding because this process does furnish a means of cutting fabrication costs in countless cases. A thorough study is necessary since there are right ways and wrong ways of welding structural shapes, and the fact that design

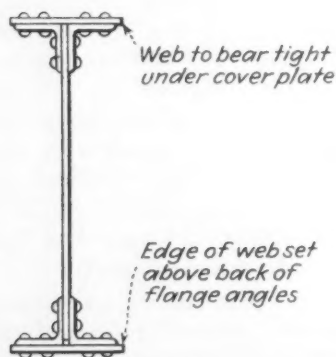


FIG. 1—In riveted construction, unless the edge of the web plate is sheared (upper), it is set back from the flange plate (lower).

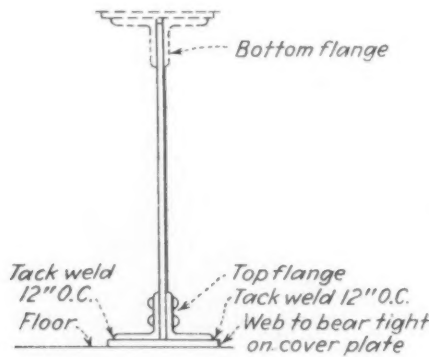


FIG. 2—Procedure in assembling the machined edge of a web plate with the flange angles and plate.

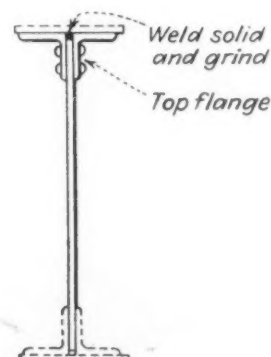


FIG. 3—Alternative construction where sheared or universal plate is used.

Structural Welding ♦ ♦ ♦

and shop drawings and often without full information throws off cost estimates.

It is common experience among fabricators, for example, to receive framing plans which indicate girders, columns, beams, etc., accompanied by such a note as this one: "Girders may be welded." Or "Column details are to be arc welded." Nothing definite is indicated regarding the size and the amount of welding desired. It is evident that when the estimators price the job, they must play safe. The possible welding that might be demanded by the designer is assumed—not the amount that is actually needed. Later on, the girders or columns will be detailed with the correct welding, but even if the designers accept the details as made, the cost to the owner of the structure will still be that figured into the job by the estimators.

The point made here is not that every piece should be detailed by the designers (details should be made by the detailers), but the designers should indicate clearly by notes on the drawings and by suitable items in their specifications what type of welding they will expect, what they will require for girder welding, for columns and

By G. G. LANDIS

Chief Engineer, Lincoln Electric Co.,
Cleveland

o o o

for beam to column connections. Items recurring in considerable numbers should be plainly shown on the drawings.

A common detail received in the shops is shown in Fig. 4 at *a*. The load is not indicated; neither is the position nor the size of fillet. The shop may weld the angle as shown at *b* or *c*, or it might weld it the right way, *d*—but in any case, the angle has been welded as called for by the detailer's sketch at *a*. It takes very little time to actually show what is really required.

Another detail often received in the shops is shown in Fig. 5. The column may be an 8-in. H with a sole plate $\frac{3}{4}$ in. thick or a 14-in. column with a base slab 4 in. thick, but the detailer's note is the same: "Weld." If there is any excuse for such a note in the case of a light column and base, there is none in the case of heavy ones. In the latter construction, there is usually considerable disparity between the thickness of the column section and

that of the slab base. In such designs, the welding requires special care and it should be shown clearly on the shop details.

In Fig. 5, note that the arrows point to both the flange and to the web. It will be observed that base plates 2 in. thick or less are not usually milled, so that there is a possibility of a poor bearing of the web on the base; consequently the conditions may warrant that the web be welded to the base. Bases heavier than 2 in. are milled and the bearing of the column web on the plate therefore is positive. There is no good reason in such cases to weld the web to the base. Even if there is bending in the column—in either direction—the welds connecting the flanges to the base would have to be torn off before an appreciable stress could be developed in the welds connecting the web to the base plate.

An important point to bear in mind when designing welded structures is to keep the amount of welding to the required economical amount. In a riveted member, it is not of prime importance to keep the number of holes and of rivets down to the figured minimum. For example, Fig. 6 shows a tension angle connected by a single rivet

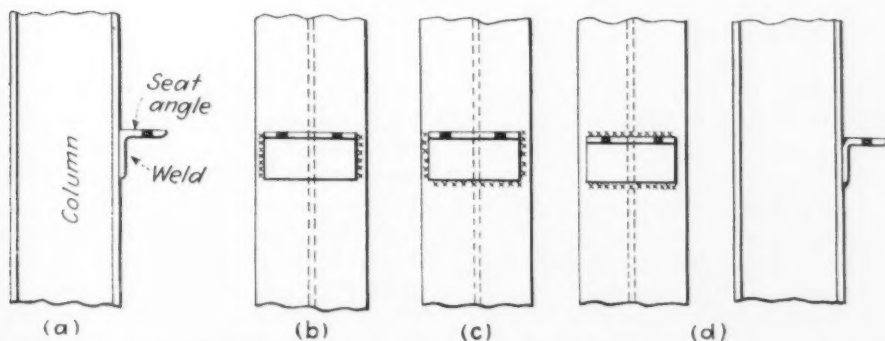


FIG. 4—Lack of definite data on a shop drawing as at *a* may lead to a number of methods (*b*, *c* and *d*) being used in fabricating by welding, tending to upset original cost estimates and result in an unsatisfactory job.

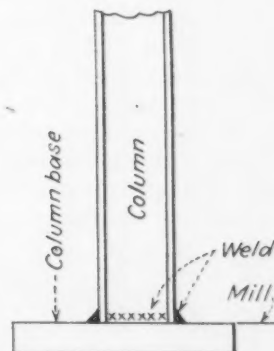


FIG. 5—Where heavy base plates are milled, assuring a good column bearing, there is no necessity to weld the web section of an H-column to that base.

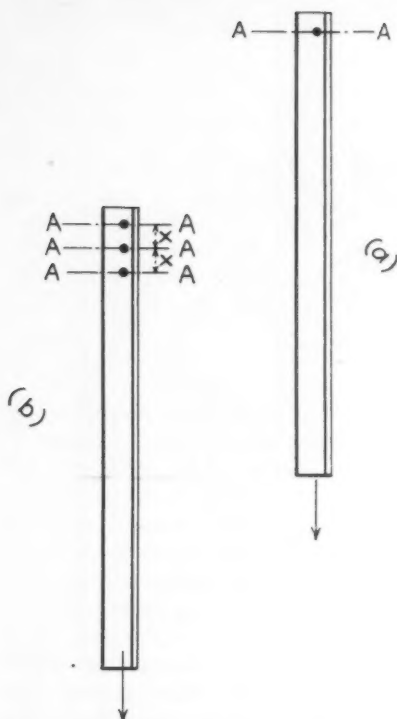


FIG. 6—In riveted tension angles, there is waste in detailing three rivets where one will carry the load.

at *a*. The effective section of the angle across section *AA* is decreased by the diameter of the hole. At *b*, the same angle is connected by three rivets. The loss of section is no greater than at *a* since the three holes are in line and spaced a distance *x* from each other. As a consequence, in riveted work, the custom exists of detailing connections for the full length of the member connected, whether this is needed or not. There is no particularly good reason for the practice and it should not be applied to welded work. While there is the excuse in riveted work that it costs no more to punch three holes than to punch one, it does cost more to drive three rivets than to drive one—and it certainly costs more to lay down 12 in. of 5/16-in. fillet than to lay down 4 in.—just three times as much.

In designing welded structures, the welding should develop the stresses, not the material; i.e., the stress should dictate the size of the welds.

Riveted work has developed its methods and practices from its own inherent nature. Welding has its own peculiarities and should logically establish practices that are in line with these peculiarities. It is not just a matter of copying riveting practices.

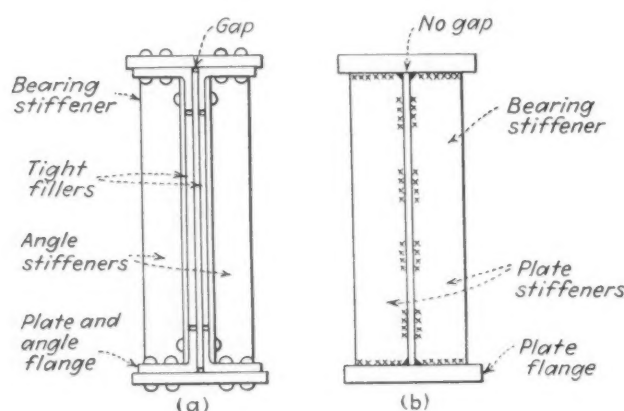
Consider, for instance, girder

stiffeners. In a riveted girder bearing stiffener needs a filler plate to make up for the thickness of the angles against the web, as shown at *a* in Fig. 7. In a welded girder, shown at *b*, no such fillers are needed because there are no angles. At *a*, the top of the stiffener is not connected to the flange; at *b*, it is welded to the flange.

The stiffener in Fig. 7 *a* is an angle, one leg of which is parallel to the girder's web and this leg may not be counted upon to transmit a concentrated load to the girder web according to bridge specifications and others. With the welded construction, on the other hand, all of the stiffener is per-

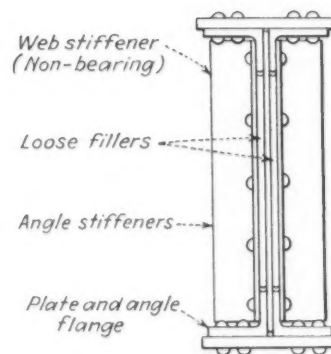
web is needed since their only function is to hold in alignment the web which they straddle. Nevertheless, many a welded girder drawing comes to the shop showing non-bearing stiffeners full-welded to the girder web—a distinct waste of time and material.

In the shops, many a welder and many an inspector prides himself on "turning out a good job" by overwelding. The 1/4-in. fillet specified turns out to be full 3/8 in.; the two-pass 1/2-in. fillet called for on the drawings gages almost 3/4 in. and the shop will draw the engineer's attention to the fact that "he's getting his money's worth and then some." Now, it has been



LEFT
FIG. 7—Riveted and welded construction each calls for its own methods and practices. These two views show how plate stiffeners are applied.

BELOW
FIG. 8—Typical non-bearing riveted angle stiffeners.



pendicular to the web and since it is directly connected to the flange, all of it may be counted upon for transmitting load to the web.

The fact that the plate stiffener in Fig. 7 *b* is welded solid at both ends to the flanges makes it a column fully fixed at the ends. Advantage should be taken of this condition in designing welded stiffeners. In the riveted construction *a* the usual set-back of the web plate forms a gap which prevents direct transmission of stress to the web plate. At *b*, no such gap exists: Consequently, at least a portion of any concentrated load is taken directly into the web. That much less needs to be figured as being carried by the stiffeners; this accounts for a further reduction in material.

Non-bearing stiffeners in a riveted girder, such as shown in Fig. 8, must be attached to the web. In a welded girder, the ends of all stiffeners should be welded to the flanges (Fig. 7 *b*), to square up the girder and hold it in place during the subsequent welding. Consequently very little welding of such non-bearing stiffeners to the girder

this engineer's business to make allowances for the human element, for shrinkage and for all such factors as well as for the calculated stresses in the connections at the time he was designing the job. Consequently, the shop should not feel that it is incumbent upon it to add welding to that shown on his drawings. To do so would indicate that the shop does not feel very confident of the engineer's proficiency in designing the welding or in the value of its own work. Overwelding should not be encouraged.

How to Hot Tin Cast Iron

*—All important data available up to June, 1940,
on the ever-growing practice of tinning cast irons.
Includes cleaning instructions, detailed data on fluxing
and hot-dip tinning, and tinning by wiping.*

THE difficulty in tinning cast iron lies in preparing a clean metallic surface, for the presence of graphite or any other non-metallic constituent prevents adherence of the tin. The different methods of procedure employed in preparing castings are directed solely to this end, according to the Bureau of Technical Information, International Tin Research and Development Council.

Since, in all cases, the outer skin must be removed from the casting, pattern design and foundry practice should be chosen, where possible, so as to facilitate this operation. Thus the outlines of the casting should be as smooth as possible, re-entrant angles and projecting corners being well filleted, and the iron should be comparatively soft. Little or no scrap should be used in the melt, and the contents of carbon and manganese should be below 3 per cent and 0.5 per cent, respectively, with sulphur as low as possible. Dry sand castings are preferable to green sand castings on account of their better surface, and in order to avoid the production of a tough skin, patent core binders containing resin should not be used. Similarly it is advisable to dispense with the use of coal dust

in the sand or blackleading of the mold, except in the case of very heavy castings, where there is danger of sand fusion. Naturally, when castings are to be treated by one of the malleable iron processes, the initial hardness or toughness of the outer layer is not important, as the treatment produces a softening.

The above remarks apply whether tinning is to be carried out by hot-dipping, wiping, or electrodeposition, but as the procedure for treating the castings after manufacture differs according to the tinning process employed, these processes will be considered separately.

Hot Dipping

Preparation of the casting for hot dipping is as follows:

Decarbonization: Since the graphite in the iron is one of the main sources of difficulty, a number of writers^{4, 10, 14, 15} recommend preliminary heating of gray iron castings to decarbonize the surface layer. This procedure, which is intended mainly for heavy castings, consists in heating them at red heat for 4 to 8 hr., in boxes packed with haematite, or other oxide of iron or manganese. This treatment is not recommended universally and Nightingale¹¹ states that it tends

to make the subsequent tinning uneven.

Cleaning of the surface: Cleaning follows the same general lines, whether decarbonization has been carried out or not, although a wide range of methods of procedure is advocated by different writers. Broadly, there are two methods of removing the outer skin from a casting—chemical and mechanical. The chemical method consists of pickling in acid, and the mechanical process may be by machining, sandblasting, or tumbling. Since any of these processes may be reasonably effective, every manufacturer has his own ideas as to which method or combination of methods is best.

Schott¹, Proctor¹⁰, and Michel¹² consider that it is preferable to use mechanical means only. Schott¹ recommends tumbling with basalt chips for 36 to 48 hr., in a drum revolving at 30 to 36 r.p.m.; Proctor¹⁰, however, favors sandblasting, while Michel¹² considers the treatments to be equally satisfactory.

Marnach⁷ and Nightingale¹¹, state that the best results are obtained by sandblasting followed by pickling for a short time, although Imhoff¹² suggests this procedure for heavy castings only. According to Nightingale, the surfaces of castings, which have not been sandblasted, are liable to retain particles of molding sand embedded in depressions, even after the articles have been pickled. Others consider that pickling may be successfully employed without preliminary sandblasting or tumbling, unless the surface condition of the metal is bad.

Two pickling agents are in common use—sulphuric acid and hydrofluoric acid—and various concentrations and mixtures of these are recommended. The concentration of sulphuric acid may vary between 10 per cent and 25 per cent, and pickling is continued until the castings are light gray in color, which requires 18 hr. or more. The pickling bath may be maintained at 60 deg. C. (140 deg. F.), in order to reduce the time.

According to Eyles⁸, sulphuric acid alone should be employed only for the short treatment necessary after machining or sandblasting. When cast iron is pickled for any length of time in sulphuric acid, the graphite, combined carbon, and silica form a continuous thin film on the surface, which adversely affects the adhesion of tin. This film is in-

soluble in sulphuric acid, and is not readily removed by mechanical means. Moreover, the solution attacks the metal rather extensively, thereby involving waste of acid.

Hydrofluoric acid dissolves black iron oxide and sand, which are insoluble in sulphuric acid, and gives much less deposit of carbon and silica on the surface; it has also less action on the metal itself. There is evidence, however, that some of the silicon in the surface is in a form which is not readily attacked by hydrofluoric acid, probably existing as iron silicide or being protected by a metallic film. In view of these considerations, Eyles⁷ and Michel¹³ recommend a solution containing 5 per cent sulphuric acid and 5 per cent hydrofluoric acid, thereby combining the most useful properties of both. Blum and Hogaboom⁸ also recommend a mixture of hydrofluoric and sulphuric acids for pickling cast iron preparatory to electroplating; in this case, 4 per cent hydrofluoric acid is suggested, with a small addition of sulphuric acid.

Marnach⁷ and Nightingale¹¹ recommend pickling in hydrofluoric acid alone to follow sandblasting. Proctor¹⁰ advocates the procedure as the main method of preparation where sandblasting or tumbling is not possible, while Parry² considers it the best method in any case. The concentration of acid employed is 1.5 to 5 per cent. Weak solutions up to 2.5 per cent are sometimes used at 70 deg. C (158 deg. F.), but more concentrated solutions must be used cold. If the work has previously been machined or sandblasted, a short immersion of 15 to 30 min. is sufficient, according to the concentration of the acid. When the castings have not received mechanical preparation the pickling time is considerably longer, depending on the surface condition. Whenever hydrofluoric acid is used, a lead-lined vat is necessary and workers should wear rubber gloves, etc.

Hydrochloric acid, although not so popular as sulphuric or hydrofluoric acids, is sometimes used. Thus, Marnach⁷ and Jaeschke¹⁵ suggest it as an alternative to the other pickling reagents, while Imhoff¹² recommends a mixture with hydrofluoric acid. When hydrochloric acid is used alone, a concentration of 15 to 20 per cent is usual, and when used with hydrofluoric acid, the mixture contains a carboy of the former and a bottle of the latter with 120 gal. of water. This

mixture is used at about 55 deg. C. (131 deg. F.). Nightingale¹¹ considers hydrochloric acid to be less effective than hydrofluoric acid because it has no action on sand particles, and also because prolonged pickling leads to deterioration of the quality of the final tin coating—an effect not noticed with hydrofluoric acid.

After pickling, the castings are washed in hot water and then in a solution of soda or other alkali to remove all traces of acid. Sometimes, however, the castings are subjected to further mechanical cleaning. Parry² suggests sandblasting after washing off the pickling acid, while Proctor¹⁰ advocates tumbling for about 12 hr. with granite chips in the presence of a solution containing soda ash (3 oz.), sodium cyanide (1½ oz.), and water (1 gal.). If tumbling equipment is not available, the work may be scoured with sharp sand moistened with the above solution.

In many cases, the castings are considered to be ready for fluxing and tinning after the neutralizing dip or tumbling, etc., and are stored under very dilute hydrochloric acid until they are required. Considerable trouble is encountered in the tinning process if the articles are left in the air in the wet condition, as rusting begins very quickly under such conditions.

In some works, however, it is customary to carry out the coppering operation described below before fluxing and tinning.

Coppering: Schott¹, Marnach⁷, Michel¹³, Becker¹⁴, and Jaeschke¹⁵ recommend coating the castings with a thin layer of copper to assist adhesion of the tin. This is accomplished by simply dipping the castings after pickling, neutralization, etc., into a solution of copper salt. No external current is applied, and the production of a red coating of copper requires less than a minute. The following compositions for the copper bath have been suggested:

Schott¹: Dilute solution of cupric chloride and potassium cyanide.

Marnach⁷: 5 parts cupric chloride, 2½ parts ferrous chloride, 1/5 part potassium ferrocyanide, and 75 parts water.

Michel¹³: Cupric chloride solution.

Becker¹⁴: 5 to 10 gm. copper sulphate, 5 to 10 gm. sulphuric acid, 1 liter water.

Jaeschke¹⁵: Dilute copper sulphate solution.

The fluxing and tinning procedure for castings are as follows:

Before tinning, the castings are immersed in a flux consisting of a saturated solution of zinc chloride, to which ammonium chloride (2 to 5 lb. per gal.) is sometimes added. The work is transferred direct from the washing or coppering solution to the flux, and from the flux to the tinning bath, without intermediate drying or washing. Sometimes the immersion in flux is omitted with coppered castings, which are then transferred direct from the copper solution to the tin bath.

For the tinning process it is usual to have two tin baths, as a good finish cannot be obtained with one. Sometimes, however, a single bath is used, the temperature being maintained at 280 to 300 deg. C. (568 to 604 deg. F.), the surface being covered with a layer of heavy mineral oil.

In the more usual method, where two coatings are given, the first bath is kept at 260 to 280 deg. C. (500 to 568 deg. F.), and is covered with a layer of zinc chloride, with or without ammonium chloride. The consistency of this flux should be controlled carefully, and if it becomes thick or hard, more of the ingredients should be added, and the hard lumps skimmed off. Ammonium chloride reduces the tendency of the flux to harden.

The castings, being wet with copper solution or flux, are lowered very gently into the bath, in order to avoid sputtering of the tin. They should remain in the bath for 1 to 2 hr., according to size, in order to reach the temperature of the molten metal and to ensure alloying of the tin and iron. Since cast iron floats on liquid tin, means must be provided to keep the articles immersed; as a rule, a perforated cover of thick sheet-iron is placed over the surface of the bath.

After removing from the first bath, the castings are shaken free from superfluous tin and immersed directly in the second tin bath. This is maintained at a somewhat lower temperature, and is covered with ¼ to ½ in. of palm oil or tallow. It is important not to allow any flux or dross from the first bath to be introduced with the castings into the second. After a short immersion in the second tin bath, the articles are withdrawn, shaken free from drops of tin or wiped with clean tow, and cooled in mineral oil, water, or by an air blast. Oil is preferable, but is not generally used for large work. Finally, the

castings are dried and cleaned in resin-free sawdust. A third tin bath is occasionally used, when the best finish is required.

The furnace consists of a steel frame structure, lined with fire brick or tile, in which the tin kettle is suitably suspended. This kettle is constructed of steel plate, stiffened with angle-iron ribs. Forced draught firing, under a pressure of 8 in. of water is recommended, and a fan is provided to remove the fumes. The furnace is preferably heated by gas, although other fuels will serve. If solid fuels are employed, it is important to have the arrangements for firing and removal of ash on opposite sides of the furnace.

The tin baths gradually become impure with use, and are cleaned periodically by immersing baskets of raw potatoes or green wood in the molten metal, after removing the flux. This treatment oxidizes most of the impurities, which float to the surface as a dross, which is skimmed off. When the finishing bath has become too impure for this treatment, it is used for the preliminary tinning operation. A pure tin bath for the final coating is generally considered essential in order to obtain a bright coating, although small additions of antimony, bismuth, or nickel are occasionally recommended.

Tinning By Wiping

As applied to cast iron, this method is generally used for articles which are difficult to tin by other methods, or which have only to be treated in small numbers. It is used especially for bearing shells and similar parts, which have subsequently to be coated with white metal. The importance of tinning bearing shells lies in the fact that the bearing metal frequently does not adhere well to cast iron, and allows percolation of oil between the shell and the lining. The film of oil acts as a thermal insulator and causes the bearing to become overheated.

The method for tinning bearing shells, as recommended by a well-known firm of white metal manufacturers, is as follows: The shell is treated with a boiling 3 per cent solution of caustic soda for half an hour to remove grease, and is then washed in cold water, and pickled in 15 per cent commercial sulphuric acid. After this treatment it is again immersed in the caustic soda solution in order to neutralize the

acid, washed in cold water, and dried. It is now ready for tinning, which is carried out by heating the shell, and rubbing with a stick of tin or pure tinman's solder, using a flux. A blowlamp is generally used for heating, and the flame should play on the back of the shell; a gas muffle furnace is, however, preferable. The tinning operation must be carried out as rapidly as possible, or the surface will become gummy and make working difficult. To prevent adhesion of tin to the

carried out in two pots. The first pot is kept at about 550 deg. F., and the surface of the tin is covered with zinc-ammonium chloride flux to a thickness of $\frac{1}{4}$ to $\frac{3}{8}$ in. The castings are allowed to remain in this pot until they come to the temperature of the molten tin, when they are removed and transferred to the finishing pot. This pot is run rather cooler than the roughing pot and is covered with a layer of beef tallow about $\frac{1}{2}$ in. thick. On removal from the finishing pot, the

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back of the shell, a wash of whiten-
ing and water may be applied.

A further application of wipe-
tinning is in improving defective or
worn hot dipped coatings.

Supplementary Information

All of the information already
given has been based on research
papers of the past decade. Few
papers of importance have appeared
since 1938 on the subject of hot
tinning cast iron. A review of the
literature by M. Cymboliste¹⁵ ap-
peared in 1935 and there have been
two anonymous accounts in Gal-
vano^{16, 17} based on published infor-
mation.

Castings: J. R. Swanton¹⁸ rec-
ommends the following procedure:
The castings to be tinned are first
thoroughly cleaned either by sand-
blasting or by tumbling in a dry
mill with star shot for 12 hr. They
are then pickled for about 12 hr.
in a solution of 1 part hydrofluoric
acid and 400 parts water and after-
wards wet milled for 10 to 12 hr.
using star shot and water. The
water is then replaced by a mixture
of 1 part hydrochloric acid and 70
parts water and milling continued
for about 30 to 60 min. After this
acid milling, the castings are stored
under water until they are to be
tinned. Storage in water should not
exceed 48 hr.

Just prior to tinning, the cast-
ings are fluxed in zinc chloride
solution. Fluxing may be preceded
by a dip in hydrofluoric acid (1
part HF in 50 parts water) and a
rinse in cold water. Tinning is

carried out in two pots. The first
pot is kept at about 550 deg. F.,
and the surface of the tin is covered
with zinc-ammonium chloride flux
to a thickness of $\frac{1}{4}$ to $\frac{3}{8}$ in. The
castings are allowed to remain in
this pot until they come to the tem-
perature of the molten tin, when
they are removed and transferred
to the finishing pot. This pot is
run rather cooler than the roughing
pot and is covered with a layer of
beef tallow about $\frac{1}{2}$ in. thick. On
removal from the finishing pot, the

For an extremely bright finish
the castings are given a light buff
with a soft cloth wheel or rolled
with hardwood sawdust in a
wooden barrel for an hour.

According to W. Imhoff^{19, 20} the
castings should first be sandblasted
and tumbled and then pickled in a
solution consisting of 1 carboy of
hydrochloric acid and 1 carboy of
hydrofluoric acid in 120 gal. of
water or an aqueous solution con-
taining 0.5 to 1 per cent sulphuric
acid and 0.2 per cent hydrofluoric
acid. If the former pickle is used,
the temperature should not exceed
120 deg. F. and is preferably 100
deg. F., while a temperature of
about 140 deg. F. and pickling time
of 20 to 30 min. are preferred for
the latter pickle. After pickling,
the castings are washed thoroughly
and put at once into zinc chloride
flux. Next they are drained well of
the flux and slowly dried so that
they have a clear salt glaze over
them. The castings should not be
allowed to dry completely since
moisture is very essential in the
fluxing reaction which takes place
in the tin bath. Next the castings
are slowly immersed in the tin bath
which should be kept at a tempera-
ture of about 475 to 500 deg. F.
They are moved about in the tin
in order to ensure that all parts are
properly coated and are then slowly
withdrawn. As the castings are
removed they are dusted with sal
ammoniac to make the metal fluid

and run it off smoothly and remove any oxides. When the run-off has ceased, the castings are quickly plunged into a kerosene oil bath and then dried in sawdust.

In an anonymous article²¹, it is recommended that the castings should be immersed, after pickling and rinsing, in a solution of neutral salts of the iron group heated to the boiling temperature. Nickel and cobalt salts are said to be suitable for this purpose. The castings which have been treated in this way are tinned by a single rapid immersion in molten tin which is free from impurities.

Bearing Shells: The procedure for preparing cast iron bearing shells for tinning adopted by R. T. Rolfe²² is as follows:

The shells are sandblasted, pickled in 33 per cent hydrochloric acid, scrubbed with a wire brush in hot 3 per cent caustic soda, washed in cold water and then coated with copper by immersion. The coppering solution contains 1 lb. of copper sulphate and 1 pint of sulphuric acid in 2 gal. of water. The shells are immersed in this un-

til they acquire a good coppery red color when they are allowed to dry off gradually.

According to R. Warren²³, the bearing shells are first roughly freed from any dirt or grease, immersed for about 30 min. in a 5 per cent solution of hot caustic soda and then washed in running water. They are then pickled for 30 min. in a solution consisting of 1 part of sulphuric acid and 6 parts of water, given a dip in caustic soda solution and then washed in running water. Tinning is carried out after fluxing.

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Procedure for Welding Die Castings

DIE castings today serve not only a decorative function, but have many structural applications. For instance, many automobiles have two carburetors, both made of die castings. The Chrysler automatic gear shifting mechanism and associated governor parts, fuel pumps, filters, housings for gears of all types, washing machine parts, vacuum cleaner parts, wood working machine parts, vending machines, business machines and many other parts are die cast.

White metal (die casting), which for years was considered as unweldable, is now being satisfactorily welded with a special rod, known as Aladdin Rod, according to the Aladdin Rod & Flux Mfg. Co., Grand Rapids, Mich.

This rod, when applied according

to instructions, makes a weld that is said to have as great a strength as the parent metal. The broken edges are V'd to about 45 deg. and the surface is cleaned of any plating or scale back from edges of the V at least $\frac{3}{8}$ in. Welding from one side only is recommended. Never more welding than to just smooth up the job is suggested for the underside, and then only after slightly veeing out crack.

It is recommended to heat the metal until it starts to flow, and turn the flame parallel to the surface, and with side of flame hold metal at this heat. The welding rod is heated to the same temperature; with both base metal and welding rod at this temperature, the rod is touched to the break and will flow into the V, thoroughly

fusing. The operation is repeated until the break is completely filled. It is necessary to kick rod into the weld to break down skin resistance, as the filler rod will lie on surface and will not fuse if only heat is applied.

The thoroughness with which the welder prepares the piece to be soldered is important! (1) It is necessary that the casting be hot enough to flow the rod without the aid of the flame; (2) the film of rod is brushed into the open pores under the flame, being certain to thoroughly tin the surface; (3) when the rod is filled into the V, it is important not to guess whether it is fused with the tinned surface or not. Be sure! The last two points, if not done properly, are the cause of most failures.

Welding Enclosures Speed Work

PLANT expansion and the resulting relocation of several production departments at the Reliance Electric & Engineering Co., Cleveland, have made it possible to introduce some improvements in the facilities afforded the men who handle the welding operations.

The first improvement was concerned with the introduction of canvas enclosures for the welding booths. (See illustration.) The only rigid part of the enclosure now is the plant wall against which all the booths are located. Three sides of each booth make use of regular brown welding canvas, hung by the corners from standard safety zone stanchions, 6 ft. 2 in. in height, with a base 125 lb. in weight. Each stanchion has bolted to it a light sheet steel strip which projects approximately 12 in. on either side of the upright to prevent injurious light rays from passing through the curtain junctions, and to provide a snug enclosure of each booth. The stanchions used at the corners of the booths have two of these light sheet steel strips bolted at right angles to each other to form tight corners. Eyelets in the top corners of each section of welding canvas permit fastening it securely to hooks in the stanchion tops. This method of holding the enclosures in place is important because it eliminates wires or pipe supports across the tops of the booths, permitting much greater freedom and safety in depositing work from overhead cranes.

The canvas is of standardized size (10 ft. in width by 5 ft. in height) to facilitate its interchange with other departments where similar enclosures are used around engine lathes as protection against flying chips, around spot welding operations to guard against flying sparks, and around other work to corral flying nails, metal particles, etc., that might endanger passers-by.

The second improvement made

ABSENCE of rigid frames of any sort around welding booths or across their tops makes it easier to move equipment into or out of the enclosures, particularly by overhead cranes. Ventilating system operates on principle of moving low volume of air at high velocity, and holds to a minimum the fumes incident to welding operations.

possible with the new location of the welding booths is concerned with the method of ventilation that has been worked out. (See illustration.) Basis of the system is the use of a low volume of air at a fairly high velocity—545 cu. ft. of air per min. per intake at approximately 4-in. static pressure. A 15-ft. length of flexible tubing, 5 in. in diameter, and individually counterweighted with light air-

plane cable, is dropped into each booth from an overhead main ventilating line serving all welding stations.

Each tube has a bell end (screened since one of the welders lost his cap up one of the pipes) and is just the right length to be readily maneuverable around and above the work. No tube is long enough to touch the floor or to be laid on it.

A 5-IN. flexible tubing, individually counterweighted with light airplane cable, and equipped with screened bell end, can be moved directly over welder's work. High velocity of air picks up fumes from welding operations which would otherwise escape into the air which the welder must breathe.



Design of Burner Tip for Flame Hardening

INNUMERABLE burner designs have been presented to the industry; some may have been new, but very often an old principle has been disguised to present an altogether new appearance. The burner presented herein is not new, but it is something that may have been overlooked because of its simplicity and its lack of newness.

The mixing-tee has been the answer to many gas engineering problems, but it is difficult to imagine a mixing-tee replacing an oxygen-acetylene flame hardening torch. The report herein deals with a burner that offers a simple solution to what appeared to be a difficult problem.

Several months back, the author was presented with the problem of hardening the cam lift surface of an automobile camshaft by selective hardening, using manufactured gas as a fuel. The job was already being done with oxygen-acetylene on an experimental laboratory hook-up, but the manufacturer thought that if gas could be used as a fuel it might be more adaptable to use on the machine which had been perfected. Four facts were in favor of the use of gas: first, the high cost of acetylene; second, the high initial cost of acetylene and oxygen handling equipment; third, the critical temperature limit; and fourth, the high flame temperature and the fast liberation of heat of the oxygen-acetylene flame necessitated external cooling of the torch and burner tips by water coils. The cooling was very complicated, and the smallness of the copper cooling coils and the extreme hardness of the water caused liming and consequent stoppage necessitating shut-down of the machine.

It was decided that the best means of solving the problem was to design a torch that could be made in the shop and thus reduce the

high initial cost of burner equipment. After some experimenting it was found that, due to the fast heating time required, it would be necessary to use oxygen to increase the flame temperature. It was then thought that by blending oxygen and air there would result a saving in oxygen cost. This was tried and excellent results were obtained, especially in the ease of operating the torch; the blending of air with the oxygen greatly decreased the tendency to backfire. The heating time was slightly higher than when acetylene was used, but the enormous saving in fuel cost that was possible encouraged carrying on with the experiments. The resulting design of burner and its accomplishments by adapting it to the flame hardening machine are given in the following paragraphs. The design of the burner tip and mixing barrel is shown in detail in the illustrations.

Fig. 1 shows a cross-section of the burner tip in assembly with the burner holder. The path of the air-gas mixture and the by-pass for flame retention is shown. The steel holder into which the brass insert is pressed is tapped to fit a $\frac{1}{4}$ -in. pipe connection. The face of the burner tip was recessed between the flame retention slots to decrease the tendency of the flame to float away. The manifold pressure was found to be between $\frac{1}{4}$ and $\frac{1}{2}$ lb. per sq. in.

Fig. 2 is the engineering drawing from which the brass inserts were made. On it is shown all dimensions pertaining to the manufacture of the tips. The total burner area is 0.036 sq. in., with 0.005 sq. in. or 13.3 per cent of this area devoted to flame retention.

The tip was made from $\frac{5}{8}$ -in. round brass stock; in this particular application no trouble was experienced with the ordinary brass tip in a steel holder. For other applications it might be necessary to

make either one or both of the parts from some heat resisting alloy. Brass, because of the ease of machinability, is the ideal material if it is applicable.

The most difficult procedure in the manufacture of the brass insert is the milling of the 0.015-in. wide flame retention slot. This is a particularly delicate operation because of the necessity of an efficient method of flame retention. As a mechanical flame retention device this one is particularly effective, as it was found that the velocity of the gas issuing from the burner ports was as great as 240 ft. per sec.

Fig. 3 shows a cross-section of the mixing barrel. This was made just as it is shown, an ordinary mixing tee made of pipe fittings and copper tubing. It seems a bit crude but its simplicity and low cost of construction was one of the reasons it so readily adapted itself to this application.

Oxygen was introduced at a pressure of 9 lb. per sq. in. through the top copper tube. The oxygen orifice was drilled with a No. 44 drill; this gave a consumption of 154 cu. ft. per hr. This was varied so as to provide an adjustment on the burner. Changing atmospheric conditions and slight changes of the specific gravity of the gas required that this be made a variable.

Air was blended into the oxygen stream through the second orifice. The air was at a pressure of 10 lb. per sq. in. and passed through a No. 45 orifice, giving an air consumption of 63 cu. ft. per hr.

The gas entered through the bottom orifice at a pressure of $6\frac{1}{2}$ lb. per sq. in. The gas orifice was drilled with a No. 45 drill; this gave 190 cu. ft. per hr. at the burner tips. This mixture is well on the reducing side as it was found that by adjusting it so, scale was less apt to form on the surface of the cam and thus grinding and finish-

Camshafts

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ing was reduced to a minimum. It was also found that a higher flame temperature resulted from the excess gas adjustment. This adjustment gave a very bushy flame about 5 in. long with a cone length of about $\frac{1}{2}$ in. The assembly of the mixing barrel and the two burner tips and their placement in relation to the surface of the cam is shown in Fig. 4.

It was found that the burner tips should be placed so that the cam surfaces lie just outside the cone of the flame; in other words, about $\frac{3}{4}$ in. from the face of the cam to

The cam was heated to approximately 1600 deg. F. to insure all of the carbon being in solution, and then quenched in a stream of air. This gave a hardness of about 50 Rockwell. However, the acceptable limits were confined to 50-55 Rockwell hardness. This corresponded to a 70-80 Scleroscope hardness, which was sometimes used to determine the surface hardness of the cam. The heating time with the gas-oxygen torch was 21 sec., as compared with 17 sec. when the acetylene-oxygen was used.

The machine set-up employed the

The analysis and specific gravity vary slightly due to the mixing of water gas with the straight coke oven gas during peak loads. This is a temporary condition and will be corrected upon the completion of a battery of 41 new ovens and a 12,000,000 cu. ft. holder. This situation has created no difficulty in the operation of this equipment due to the ease of varying the adjustments. The analysis shown was used in the design calculation; also

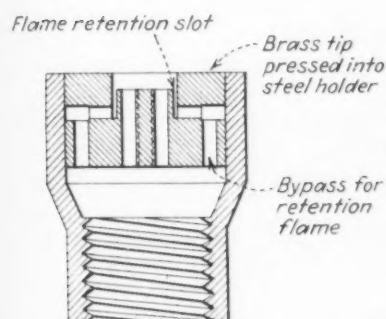


FIG. 1 — Cross-section of the burner tip in assembly with the burner holder.

the face of the burner. It was also found that if the points of the cone were directed just below the center of the area to be heated a more even heating would result, due to the heat running backwards into the point of the cam. This is slightly exaggerated in the drawing.

In this figure is shown the analysis of the cam material. The analysis is interesting in that it is a gray iron casting with a fairly high alloy content. It is interesting to note that the critical temperature of 1400 deg. F. is low enough to obtain easily with our maximum flame temperature, which was known to be above 3000 deg. F.

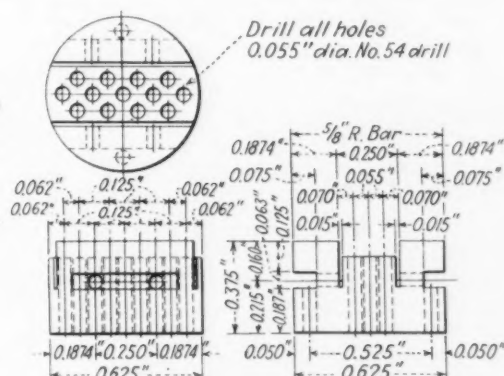


FIG. 2 — All dimensions for the manufacture of the tips are shown here.

use of 12 torches such as described here. The oxygen, air and gas lines were connected to headers in which the pressures were regulated to the pressures shown in Fig. 4. The header arrangement, in addition to providing easy lighting and control, also eliminated the individual adjustment of the burners in order to standardize the flame adjustment from the various torches.

An analysis of the gas is given for comparison with gas available in other localities. It should be noted that the analysis shows a high percentage of hydrogen which tends to increase the rate of flame propagation.

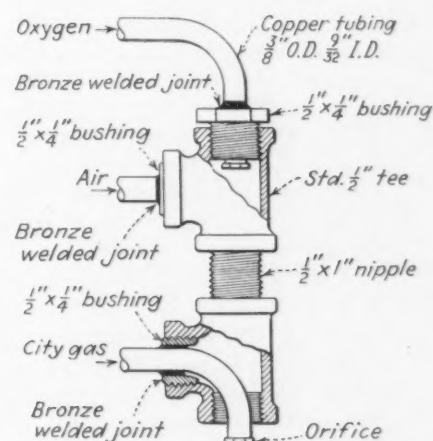


FIG. 3 — Cross-section of the mixing barrel.

a specific gravity of 0.40 was thought to be a good average.

This make-shift torch, designed and constructed in the shop, is really doing a good job of flame hardening. A summation in outline form listing the accomplishments of the make-shift burner might be of interest:

(1) The design eliminated the use of acetylene and substituted for it a practical, low priced gas, easy to handle and easy to control.

(2) The high initial cost of installation was eliminated. The cost of construction of these torches and their installation on the customer's machine, along with all necessary

reducing valves and regulators was approximately \$500. Of course, a lot of corners were cut in this cost; a compressor was bought second-hand and at a very good price; but, nevertheless, the job was put in operation for \$500.

(3) The cam surfaces were satisfactorily hardened, and the rejects due to heat treatment were reduced almost 50 per cent.

(4) All external cooling devices were eliminated, thus doing away

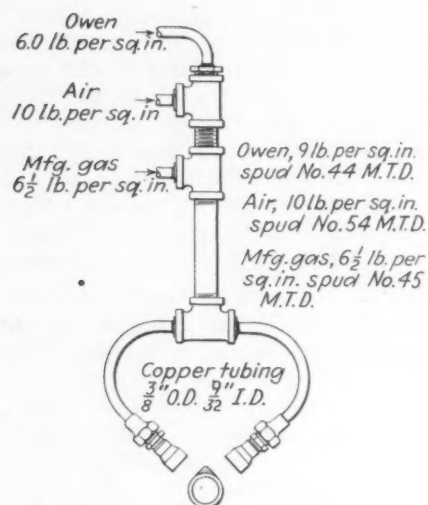


FIG. 4—Assembly of the mixing barrel and the two burner tips. The B.t.u. content of the gas is 570; analysis of the gas is 1.14 CO₂, 3.04 ill., 0.43 O₂, 3.00 CO, 57.35 H₂, 31.04 CH₄, and 4.01 N₂. The analysis of the cam shaft iron is 0.30 Ni, 0.70 Cr, 0.40 Mo, 2.0 Si, 3.0 C and 0.60 Mg. The critical temperature of this iron is 1440 deg. F. The shaded area shows approximate hardness pattern of the camshaft.

with costly maintenance. These torches have now been installed a full year and no replacements of burner tips or mixing equipment has been necessary.

The burner tip and mixing barrel described here have been used on other applications. It was found that in some cases it was not as readily adaptable as other designs, but for any selective heating job with the maximum heating temperature not exceeding 1800 deg. F., the design was found to be very satisfactory. The capacities of the mixing barrel and burner can easily be varied as can the size and shape of the flame.

The Randupson Process

—Operating Details Discussed

THE November meeting of the East Midlands Branch of the Institute of British Foundrymen was devoted to the presentation and discussion of a paper entitled "The Randupson Process of Cement Moulding,"* by F. W. Rowe.

According to the *Foundry Trade Journal*, J. C. Hallamore, who opened the discussion, said Mr. Rowe had frequently referred to the cost, and he asked if the method was very much cheaper, but that other costs were higher, and he would like to know how that balanced out. The drying period seemed to occupy rather a long time. Was it possible to reduce that at all? They were still using ordinary sand cores for intricate work, and he asked if it was possible to combine the two methods.

Mr. Rowe said the point of the process was to get the total costs down, and while their molding costs were very much reduced, the increased sand cost robbed it of some part of the advantage. For a job where cement molding was suitable, he would say that the total combined sand and molding cost worked out at an average of about a third cheaper. It was possible to hasten the drying a little, but it was not advisable to have a temperature above 80 deg. F. If the drying were done too quickly, it caused cracking through expansion.

Quite frequently oil-sand cores were used in cement sand molds. It had not been found possible to increase the green sand strength of cement sand by any other additions which would give a satisfactory job. Almost anything that was done either seemed to increase the drying time or reduce the permeability.

F. Dunleavy asked what method was used for treating the sand that had been left over, and what would be the effect of leaving the facings in the sand over a period of days

during ramming. There was a good deal on that point that he did not understand. One query was, how did they locate the joints? What method was used for repairing the mold?

Regarding the loss in cement of 6 to 10 per cent, he asked if there were any other losses apart from the cement. What percentage of silt was there in this, and how was it removed?

Mr. Rowe said the heavy loam jobs were the ones where the cement molding process, properly handled, should shine, and did shine. He had seen a very large amount of condenser work done in cement sand, and the cement sand was usually worked in a pit to save material. That was, it was struck up in a deep pit in the floor, and gradually built up, and the core was separately constructed. No difficulty was experienced providing the high crushing strength of the sand was remembered. In that respect, Mr. Rowe described the action of heat on a cement mold, and the reason that with so high a crushing strength they did not get trouble through cracking of the mold. The layers of sand adjacent to the hot metal were dehydrated and lost strength.

With regard to the location of joints on these molds, any method which appealed to them, as foundrymen, could be used. Most of their work was located by buttons and sockets on both halves of the pattern plates, which seemed to be the most popular method. Drawbacks were one of the easiest propositions to deal with in cement molding. Far less careful ramming was needed than with a normal drawback, because within 6 hr. at the most it was strong enough to lift away, but not strong enough to cast. In 24 hr., any of the biggest molds, weighing 6 or 8 tons, were strong enough to lift by the crane.

Ribs were made by the usual method. They were left loose and drawn out after the main body of the pattern was drawn away. No

* For details on process, see *THE IRON AGE*, Nov. 19, 1936.

serious difficulty was experienced with patching. Ordinary patching was done before the mold set.

With regard to the cost of the sand, Mr. Rowe said every bit of backing or facing sand had to have 6 to 10 per cent of cement in it every time it was used, which, of course, accounted for the big increase in cost. The usual silt extraction was from 10 to 21 per cent on the old molds.

B. Gale recalled that Mr. Rowe had made claims for the Randupson process that the extra cost of sand and preparation was offset by the great saving in the molding time. One could appreciate that, on large castings molded by hand, a considerable saving would be made on the ramming time due to the "flowability" of the cement sand as compared with ordinary molding sands, but he (Mr. Gale) wondered how the time would compare with the ramming of similar molds made on large jolt-ram machines or on sand-slinger machines. Could molds made in cement sand be rammed by the jolt or sandslinger machines?

Mr. Rowe, referring to a big jolting machine, said the saving was not quite as dramatic as with an ordinary hand-rammed mold, but of course jolting machines were rather expensive. While they had quite a large number of molding machines, there again, probably their biggest saving was not so much on molding as on box parts, as they had none of these at all. A rough wooden box was built up each time, and could be made just the right size.

There were not many people who could afford a jolt and turnover machine for, say, a 6x4-ft. box part. If they had one, very often they found their best jobs would not go on it. Then again, there was the amount of crane lifts needed on any jolting machine, using ordinary cast iron box parts. The cement molding process had that big advantage over ordinary foundry methods; far fewer crane lifts were needed.

W. C. Marshall said that Mr. Rowe had emphasized the poor green strength of cement sand and, combining this statement with the maximum figure of 7 in. given for sand thickness on large molds, asked if any difficulty was experienced with molds sagging. Was the thickness increased in the top of the mold to resist metal pressure? If not, he presumed that the amount of reinforcement was much

greater than necessary with large green sand work.

In connection with the repeated use of old or backing sand, was there a tendency for the sand to receive a coating of cement which might affect its properties?

Finally, was any chill effect experienced due to the use of cement sand, particularly with gray iron? Although it was appreciated that mold thicknesses were small, it was possible that the castings were slightly affected in this direction.

Mr. Rowe said the cement sand had very little green strength, and care had to be taken with the big molds that they did not sag, until they had had a chance of hardening. They worked molds up to about 4-ft. square on a board, which had to be strongly constructed, but over that limit they liked to turn the mold out on to a flat steel plate.

With regard to the reconditioning of sand, there was no pick-up of cement. The backing sand, after being crushed and reconditioned, was equivalent to a new sand with about 1 per cent of cement added. They could go on using a reconditioned sand almost indefinitely, for the dead cement was rubbed off in screening.

There was a slight chill effect, due to cement molds, which was equal to about 0.15 per cent silicon in a gray iron. The same fracture was obtained from casting in a cement mold metal containing 2 per cent silicon, as casting in ordinary molds with 1.8 per cent silicon.

Mr. Dunleavy asked if there was any definite percentage of loss of cement. He could visualize the process working successfully in a new foundry, he said, but it would be very difficult to work it in an old foundry.

Mr. Rowe said they started off with a new sand and added to it, say, 8 per cent of cement and 6 per cent of water. Once that sand had been used the cement was lost, but after sieving the sand to remove all dead cement it was ready to start with again.

E. Holland asked what would be done with a complicated joint, and how soon could a pattern be taken away from a mold? Was there any adhesion of the cement to the pattern, or had the pattern to be treated before use?

Mr. Rowe said on a very complicated joint it was not possible to

ram straight on. The best method was to make the bottom half one day, and the next day make the top half. The main thing about a pattern was that it had to be taken out quickly, as there was a slight expansion of the mold. To prevent adhesion of cement, they usually oiled the patterns all over with paraffin before using, and they used a cellulose paint on patterns, and got very clean lifts.

A. E. Peace was interested to know whether ordinary cement was used, or whether it had a special lime content. He also wondered if a fineness was specified. It occurred to him that temperature must have a profound effect on the setting time. Was the time seriously affected in hot weather in the summer, or in frosty weather in winter, and did similar differences in temperature have an effect on the milling or mixing?

He presumed there was a shrinkage of the mold on setting, and he would like to know if it was very considerable. A very coarse silica sand, presumably, would be used to get the maximum permeability; was that sand gradually broken down when it was crushed for re use?

Mr. Rowe said the ordinary Portland cement was found to be better than the very finely ground cement. As Mr. Peace had remarked, temperature had a profound effect on setting time, the setting practically ceasing at freezing point, while a very high temperature would considerably affect the setting time. They did not give any special heating. His instructions were that the temperature should be maintained at a minimum of 55 deg. F., but he would say that as many instances of 48 deg. were recorded as for 55 deg.

Usually there was shrinkage of the molds, but it was very slight. No special allowance for it was ever made in patternmaking, the difference being infinitesimal between the cement and ordinary sand. While the sand was considerably harder and stronger than an ordinary sand, it would not stand any more, and it would not withstand any less impingement of metal than a very good dry sand.

Coarse silica sand was usually rather expensive, and they found it more economical to use ordinary silica sand. The former was slightly better, but not sufficiently so to warrant the increase in price.

New Equipment . . .

Presses, Shears, Spinning Lathes, Etc.

The latest additions to hydraulic presses, to riveters and squaring shears are here described, as well as bending rolls, metal spinning lathes, drawing compound coating machines, and injection molding presses.

A RECENT development of the *E. W. Bliss Co.*, 53rd Street and Second Avenue, Brooklyn, is the 750-ton Hydro-Dynamic press. An intermediate cylinder gives a higher speed at low pressures (under 350 tons) and yet the press has a maximum pressing capacity of 750 tons (at normal pressing speed). This feature will be appreciated in deep drawing work finishing with a coining operation. There is also a quick advance and return speed. Other pumping units can be supplied to give faster or slower speeds as production demands. The press is constructed with a rigid, four piece, fully shrunk, steel tie-rod frame. Controls are all-electric on both production operation and die setting. Speed change and the reversal of the press slide may be

controlled by either position trips or pressure in the system. The electric control devices are mounted in the side housing of the press.

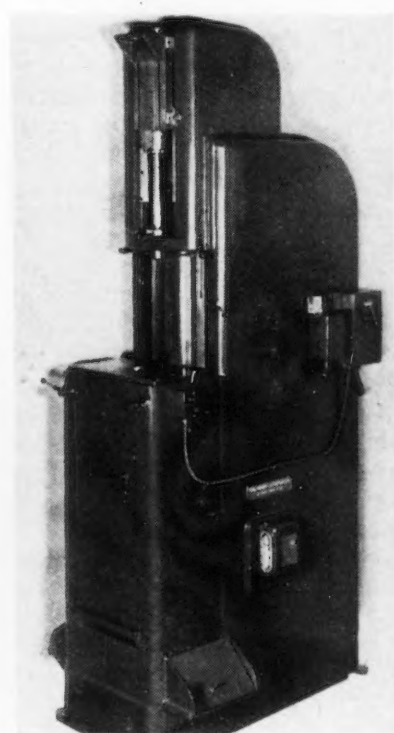
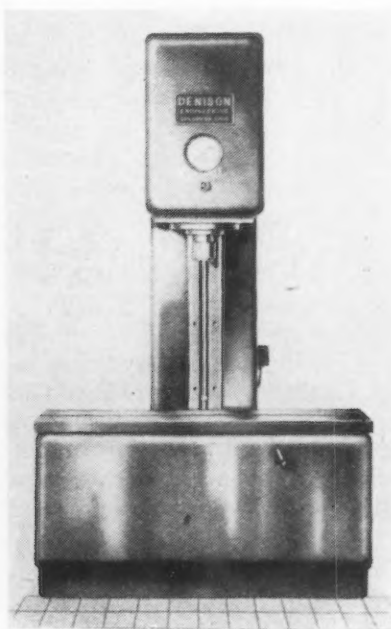
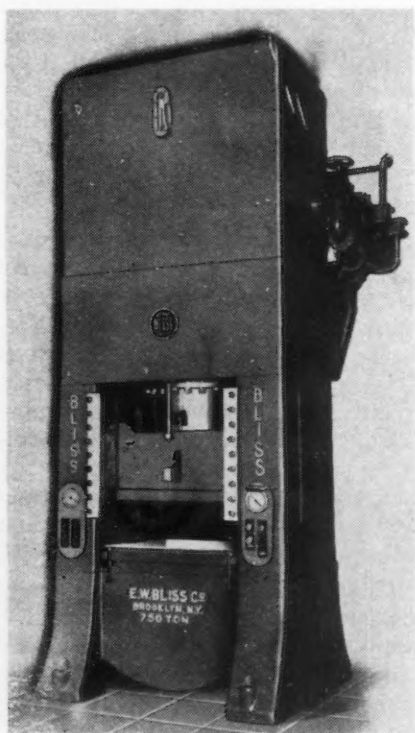
Hydraulic Straightening Press

FOR a wide range of production straightening and for production of small lot service as a press, handling round bars, flats, tubes, structural shapes, castings and finished parts, the *Denison Engineering Co.*, Columbus, Ohio, is producing the type DLSC2 hydraulic unit. Ram and cylinder are located in the upper part of the C-frame, with controls—either hand lever or pedal—and pump mechanism in the vertical column of the frame. Rapid traverse speed of the ram is maintained until work is contacted. Thereafter the tonnage pressure exerted is controlled by the operator through the lever which also governs the upper stop of the reverse travel. The press lends itself to a

wide range of special applications. It is available in 25 or 50 ton capacities.

Pull-down Broaching Machine

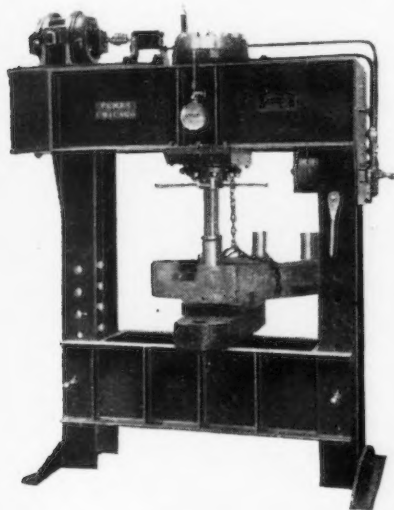
UP to the present only available on order, pull-down broaching machines are now offered as standard equipment by *Colonial Broach Co.*, Detroit, in sizes ranging from 3 to 30 tons capacity and from 24 to 60 in. strokes. They are especially suitable for the manufacture of precision parts. Completely automatic handling of the broach is provided through the use of a hydraulic handling mechanism located at the top of the column. The machine is of welded steel construction. The length of the stroke is adjusted by means of stops on the column. Manual operation is stand-



ard. The hydraulic drive is fully enclosed and speeds are variable, normally 30 ft. per min. on the down and 60 ft. on the return stroke.

Press for General Shop Work

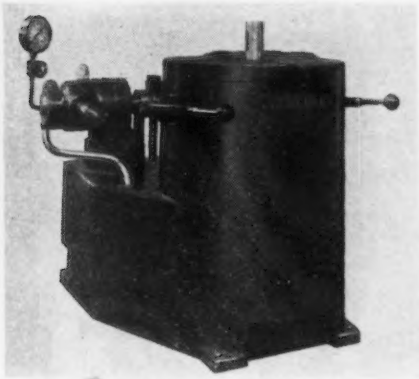
WIDE variety and a large volume of general shop work can be handled with low power cost by a new hydraulic press. With a 12-in. screw adjustment plus a 12-in. stroke of ram, this model has a total



stroke of 24 in. The platen is adjustable through a ratchet gear. Control is by a single lever. An all-welded steel frame gives maximum accessibility, while preserving strength. Capacities and sizes are made to suit, beginning with a model powered by a 1½-hp. motor. Producer is *Charles F. Elmes Engineering Works*, 230 North Morgan Street, Chicago.

30-Ton Hydraulic Presses

SELF-CONTAINED No. H-70 hydraulic press, produced by *Greenerd Arbor Press Co.*, Nashua, N. H., exerts pressures varying from 6 to 30 tons on the down stroke. Frame and cylinder are cast of hydraulic semi-steel and the cylinder is honed to size. The 18 x

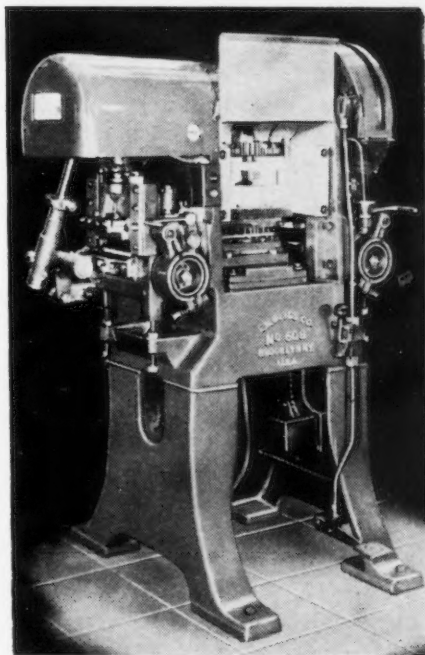


15 in. working table has a 3½-in. hole center with ram 27/16 in. diameter. The rapid traverse speed of ram, up to 15 tons pressure, is at the rate of 138 in. per min. with instantaneous changeover to 38 in. per min. within the range of 15 to 30 tons pressure. Stroke is adjustable from 1 to 10 in. The motor rates 10 hp. at 1200 r.p.m.

For assembly jobs requiring a pull rather than a push the illustrated No. H-70P pull type press is supplied for a maximum pressure of 30 tons. The ram is controlled by two handles, release of either one of which will stop the press. Pressures, working speeds and dimensions are similar to those of the type discussed above and the motor supplied is identical.

Inclinable Press and High Production Unit

GREATER capacity and size are features of the new inclinable press of the *E. W. Bliss Co.*, the Consolidated No. 10. This general purpose machine has gearing and



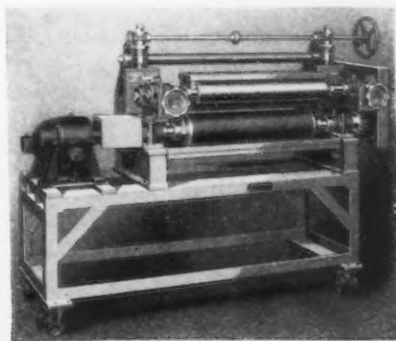
all other working parts enclosed. Strokes range from 8 to 12 in. and the bed area measures 35 x 53 in. The semi-steel frame encloses a hammer forged crankshaft of special steel and a large area flanged slide. Additional reinforcement to the heavy C-frame is given by two tie bars which are anchored by dovetails.

A production press capable of 1200 strokes per min. is another recent addition to the Bliss line of presses. A heavy one-piece cast

frame together with a light cast steel slide enable the press to run at high speeds with great stability. Two steel connections and bronze lined gibbing assure continued alinement of the slide and a long die life. Electric detectors can be employed with a protective trip. Standard stroke is ¼-in., face of slide 7 x 10 in., capacity 8 tons.

Coating Machine

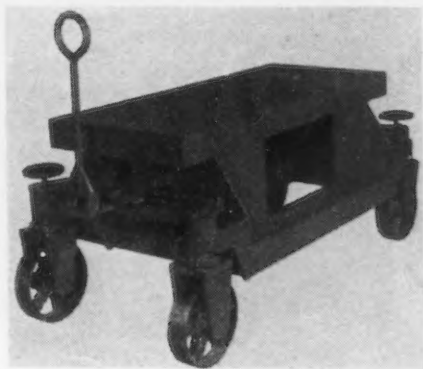
SAVINGS estimated to amount to one-third of draw compound material over the hand brushing method are said to have been effected by the use of a new coating machine produced by the *C. E. Francis Co.*, Rushville, Ind., for the



application of draw compound to steel sheets preparatory to shaping or forming. The machine consists of two corrugated rubber coating rolls in conjunction with scraper rolls. The scrapers govern the thickness of the spread and form a roll crotch to hold the compound. The lower coating roll can be adjusted to pick up its supply of mixture from a pan. The output of the coating machine can be attuned to the production set-up of the plant and specifications of consumers are met over a wide range.

Die Handling Truck

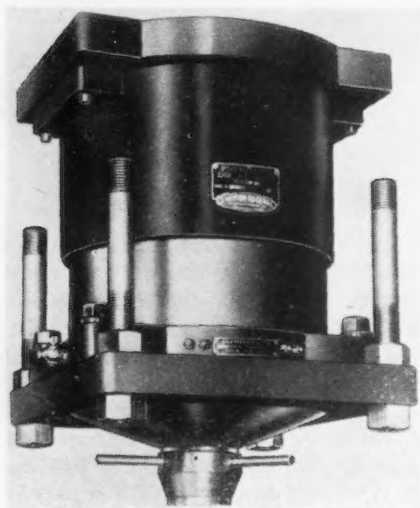
AUTO type steer at both ends of the vehicle is featured on a die handling truck produced by the *Lyon Iron Works*, 566 Madison Street, Greene, N. Y. A bar with



a removable handle for hand or power pulling controls the directional turning. The truck may be drawn from either end, while wheels can be locked in position at the rear. Thus maneuverability is improved. One wheel on each end can be braked to hold the truck during loading. Capacity is 8000 lb.; the platform measures 24 x 60 in. and is 30 in. above the ground, and the overall width is 34 in. Trucks of other specifications can also be supplied with either stationary or hydraulically elevated tables.

Pneumatic Die Cushion

RECENTLY the *Dayton Rogers Mfg. Co.*, Minneapolis, brought out a new model DM universal pneumatic die cushion. It is completely self-contained, requiring no surge reservoir and furnished

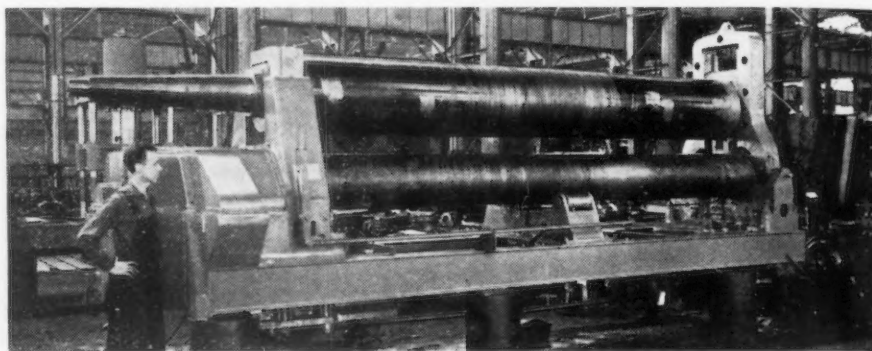


with a combination regulator and gage for shop air line connections. It can be adapted to all punch press operations and used to advantage for pressure pad control on most forming dies. Correct height is maintained and controlled by a handwheel. The removal of bolster

plates is thus made possible without disturbing the cushion installation. Six sizes are being manufactured with deep drawing capacities of 5 in. or less, with ring holding pressure up to 10 tons on 100 lb. air line pressure.

Welded Bending Rolls

SIMPLIFICATION of design has been achieved through the use of welded construction in the 16-ft.

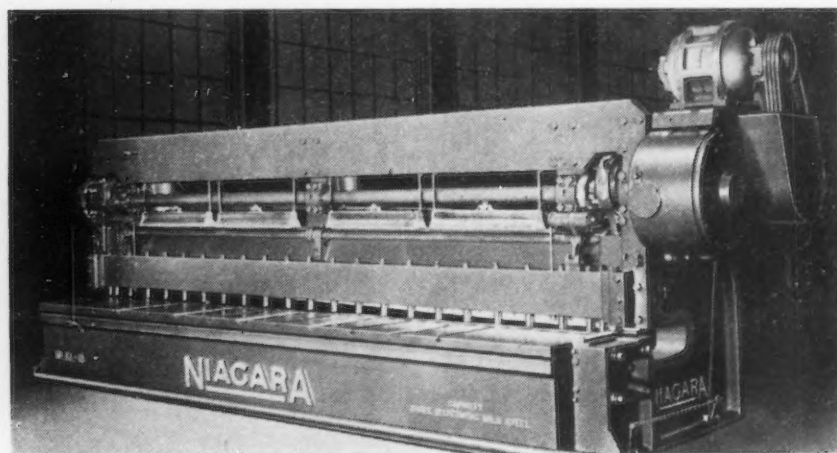


horizontal bending roll built by Southwark Division, *Baldwin Locomotive Works*, Philadelphia. This feature gives greater rigidity and better load distribution at the joints between the drive box, bed rails and inner housing. The drive gears are arranged so as to minimize any twisting moments. Oil tight boxes bolted to the frame contain the nuts and gears for screwing down the top roll. Conical shapes can be rolled by raising one end of the top roll. Cylinders and shapes which must be removed sideways from the rolls can be handled easily by using the drop-end housing which is raised or lowered by a light crane or by hydro-pneumatic action.

Squaring Shears

ADDITIONS of a new No. KL-18 power squaring shear having 18-ft. cutting length and capac-

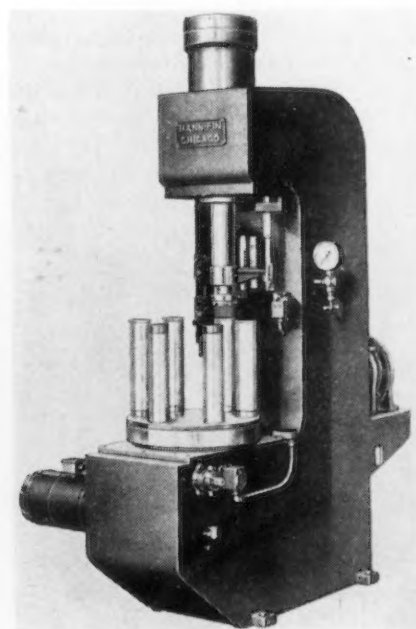
ity of 3/16 in., is announced by *Niagara Machine & Tool Works*, 637 Northland Avenue, Buffalo. This shear, equipped with a quick setting, self-measuring, ball-bearing back gage adjustable to increments of 1/128 in., offers accurate flat cutting and increased production. All drive gears are mounted on anti-friction bearings and enclosed in an oil-tight case. The shear is controlled by means of a 14-point clutch which operates in a



bath of oil. Fluorescent lights illuminate the working surfaces of the bed, and throw a shadow at the cutting line for convenience in shearing to a straight edge. Toggle-operated, independent spring pressure foot holddown gives a good grip on sheets of varying lengths.

Shell Marking Press

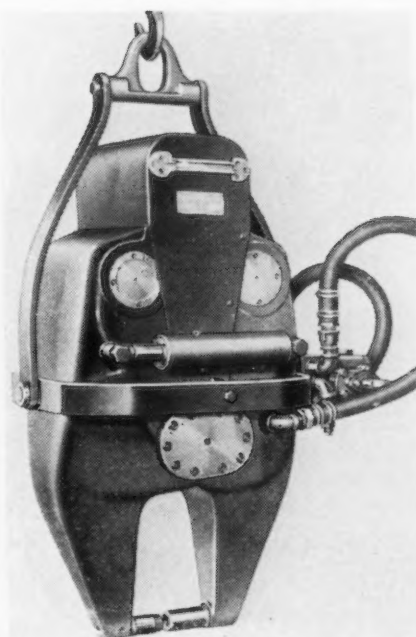
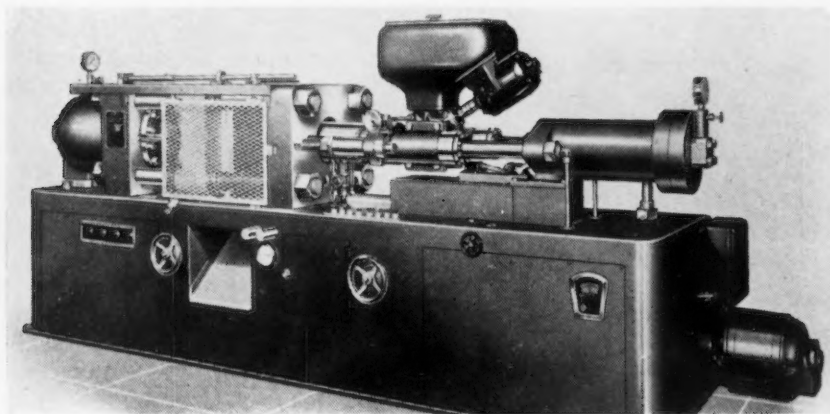
FOR marking 75 mm. shell casings and operating with a rapid automatic cycle, a hydraulic press is brought on the market by *Hannifin Mfg. Co.*, Chicago, in capacities of 10 and 20 tons. The marking die is fitted to the ram which



operates continuously with automatic reversals both at the top and bottom of the stroke. The pressure-governed reversal at the end of the working stroke insures uniform maximum pressure being exerted on the die, and uniform marking. Both maximum pressure and stroke of ram are adjustable. An electrical control operates the indexing table which is equipped with six mandrels and is driven by a $\frac{3}{4}$ -hp. motor. The operator has only to start the press, load and unload the fixture as the table advances. The press will operate at a maximum rate of 15 cycles per min.

Injection Molding Press

TO take over the work of the large die casting machines in the present re-orientation of industry toward plastic materials, *Hydraulic Press Mfg. Co.*, Mt. Gilead, Ohio, has brought on the market a new injection press of single nozzle design for 2, 4, 9 and 12 oz. capacity per cycle. Larger injection presses of 18 and 36 oz. capacity are multi-nozzle units. These presses are designed with a powerful straight-line hydraulic clamp under 200 tons pressure ensuring positive sealing of mold halves. This clamp is adjustable for molds of any thickness, keeping die set-up time to a minimum. A rapid acting injection plunger reduces the time of the cycle. The units are equipped with circulating fluid heating systems. Positive measuring of feed permits the use of the 12 oz. capacity press also for smaller molding and makes it a versatile instrument. The presses are equipped with HPM Hydro-Power radial piston type pressure generators. Pressure on the material in the injection chamber is 30,000 lb. per sq. in. Maximum mold size is $16\frac{1}{2}$ x 24 in. Maximum opening between platens is 18 in.



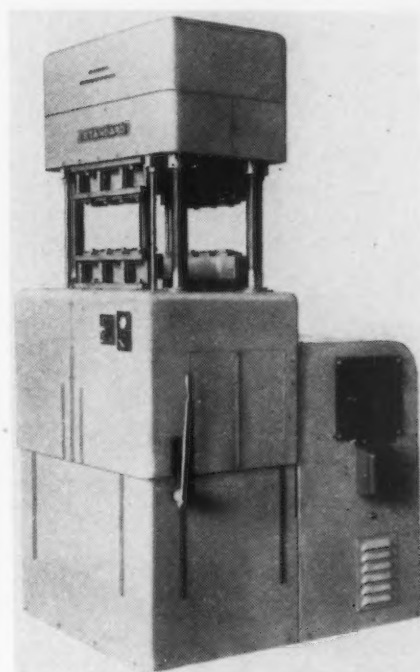
Squeeze Riveter

PRESSURE stroke feature is embodied in the new Alligator pneumatic riveter produced by *Hanna Engineering Works*, 1765 Elston Avenue, Chicago. This tool is designed to meet the demand for a squeeze riveter of the "nut cracker" type for use in restricted areas. During the initial part of the pressure stroke the driving jaw moves forward rapidly at relatively low power consumption. The mechanism then automatically merges into its uniform pressure stroke area in which the rated tonnage is exerted upon the rivet and maintained until the control valve is released. This permits the rivet to flow and to fill the hole completely with the forming of the rivet head following automatically. The riveter illustrated has a 15-in. reach, 9 in. gap and exerts 50 tons pressure, if operated under 100 lb. air pressure. Other tools can be had according to specification.

Controlled Closing Speed for Plastic Presses

"STANDARD" semi-automatic presses are now being offered with a new slow-closing control. The final closing of the mold under compression may be timed accurately and automatically from 1 sec. to 20 min.

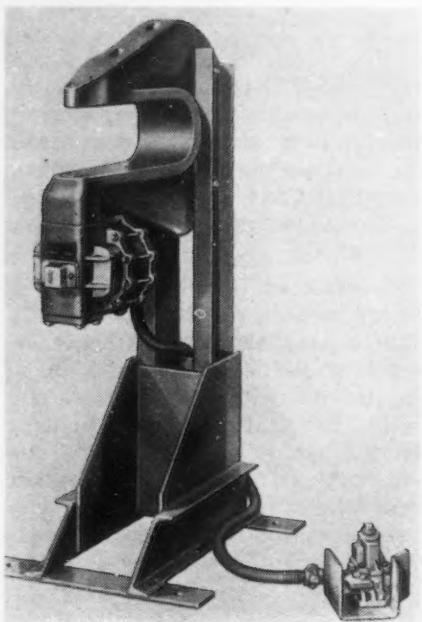
It is stated that this controlled closing action reduces to a minimum rejects and the maintenance cost of molds, especially in the production of moldings of delicate design. This feature is said to permit the use of less expensive flash type molds. The control mechanism makes the press automatic in operation, except for the actual load-



ing and removal of finished pieces. Adjustments are simple and can be set to start closing action at any point in the ram travel.

Stationary Riveter

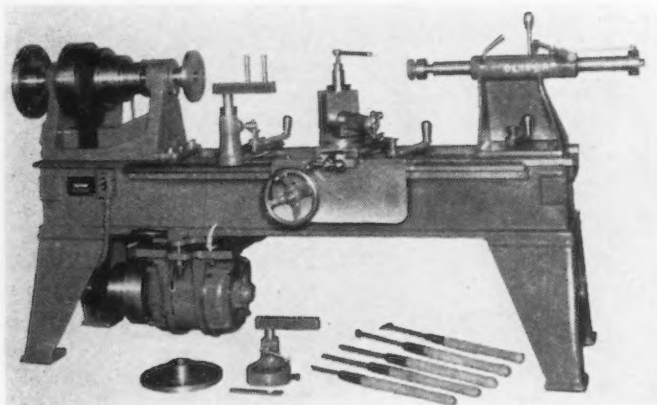
FOR aircraft subassembly riveting *Hanna Engineering Works* has built a new unit with 20 in. reach, $6\frac{1}{2}$ in. gap capable of exerting 10 tons on the rivet at 80 lb. air pressure. The ram is actuated by a pneumatic mechanism of the wedge and roller type. When the ram enters the uniform pressure zone, its initial rapid travel is automatically reduced, permitting the rivet to flow. The long ram stroke is advantageous in the assembly of stiffeners, etc., since it obviates the necessity for removal of dies. Mechanism is completely demount-



able to permit modifications in the yoke and frame. Spring return of the piston is claimed to result in considerable savings of air. A foot operated valve actuates the mechanism.

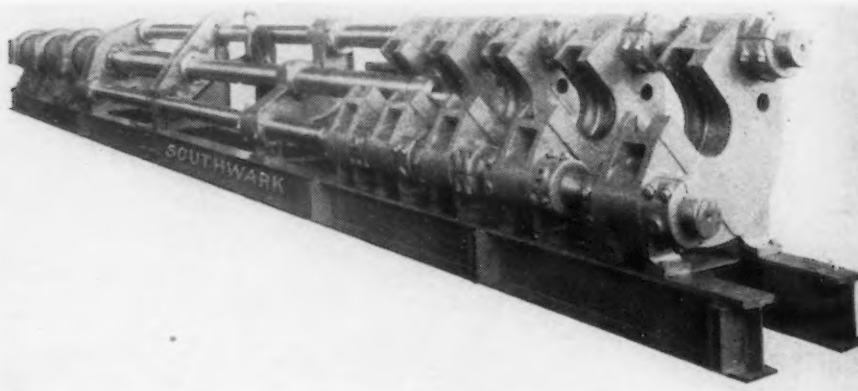
Metal Spinning Lathe

HEAVY metal spinning machines in four sizes from 16 to 30 in. have been brought on the market by *Oliver Machinery Co.*, Grand Rapids, Mich. These No. 150-M series lathes are equipped with 3-hp., 1200 r.p.m. motors (30 in. model uses 5-hp. motor) and spindle speeds run up to 2400 r.p.m. The headstock spindle is made with taper roller bearings with large thrust capacity. Machine can be had with either plain bed or hand-feeding carriage with compound swivel rest and tool holder. Equipment includes pin rest and extra heavy tool rest socket, ball bearing live tail center and set of five general purpose spinning tools, 6 and 8 in. faceplates. Motor control is by push button.



Southwark Builds Draw Bench for 15-in. Shells

SHELLS for naval and coast defense guns are put through the second stage of manufacture by this 340-ton horizontal hydraulic draw bench, built by Baldwin Southwark division, Baldwin Locomotive Works, Philadelphia. The first operation, piercing of the



heated billet, is carried out on vertical hydraulic piercing presses of approximately 1500-ton capacity.

The draw bench is fitted with five holders for the ring dies. The die-holders are arranged so as to be horizontally adjustable and are designed for quick replacement of the dies. The forward end of the hydraulic piston is fixed to a crosshead guided on the columns; the water-cooled drawing mandrel

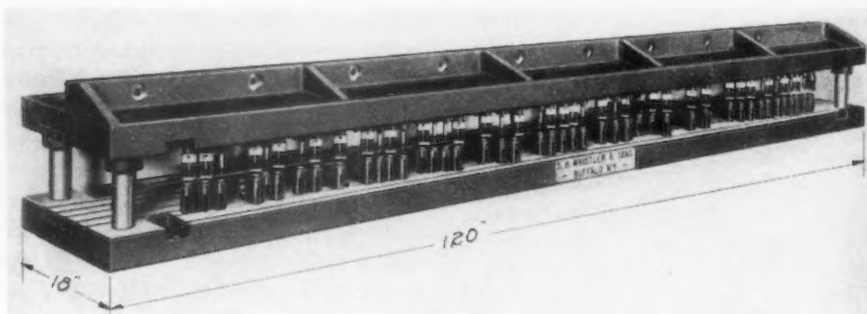
holder moves through bronze bushings fitted on a fixed crosshead. The entire unit is mounted on a structural steel base to ensure proper alignment.

The valve and piping arrangement for this draw bench is designed to give a high drawing speed and a fast return stroke so as to shorten the time during

which the hot shell forging is in contact with the drawing punch.

Adjustable Perforating Dies

VERSATILITY and adaptability of adjustable perforating dies is shown by the recent data for the new 120 x 18 in. die shoe for a 10 ft. power brake produced by *S. B. Whistler & Sons, Inc.*, Buffalo. The important feature is the saving in time and die expense



to get into production and the additional time saved when actually performing on the job. It is possible to punch 100 holes per stroke in duraluminum sheets used in airplane parts. Illustration shows 44 punch and die units arranged along the front side only, with room available for at least twice as many more. The user of these adjustable dies can instantly rearrange perforating positions, as well as sizes and number of perforations to be made, as these adjustable dies are available in a wide range from stock.



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DETROIT—Despite attempts to make curtailment of 1942 model production appear voluntary, there is no doubt in anyone's mind here that the 20 per cent cut in auto output announced at Washington last week is an effectual edict.

The automobile industry has been engaged in a concerted drive to increase production schedules on the current 1941 model. In General Motors, alone, the schedules projected for the next 10 to 14 weeks called for the production of about 80,000 or 100,000 more cars than were scheduled just a few weeks ago.

Early last week it became known that Pontiac had jumped its schedule from the previously estimated quota of 319,000 cars (to be completed before model changeovers are made) to a new total of 330,000. These additional 11,000 cars were to be built at the rate of approximately 2000 units a week, since the Pontiac schedule was being stepped up from 6000 per week to 8000. Cadillac likewise had already adjusted its schedule upward by 10,000 units, which is approximately a 25 per cent increase over the 37,564 Cadillacs and La Salles which were registered in the last calendar year. Simultaneously Chevrolet jumped its schedule by something like 50,000 units, and Oldsmobile added a few thousand. So far, nothing has been learned about Buick plans, but it is more than likely that this division will "up" its schedule, too.

There is no indication that Ford is in any position right now to make a similar move on production schedules because the Rouge plant is just recovering from the effects of the strike and is still upset by bitterness and flare-ups occurring in the factory. Chrysler's production schedule at this time remains an unknown quantity, but undoubtedly also will be affected.

Production Heavy Since August

The reason for the big increase in production schedules on 1941 models is that the industry wants to build all the cars it can before the curtailment becomes effective. So far this year (since last Aug. 1) the industry has turned out approximately 3,750,000 cars and trucks. The number of vehicles it can produce in the 15 weeks between now and Aug. 1 will be an important factor in determining the number of units each manufacturer will be permitted to produce next year, since it appears at this time that the 20 per cent reduction will be based upon total output chalked up between Aug. 1, 1940, and Aug. 1, 1941.

The way this works out, if Chevrolet adds 50,000 units to its production schedule for the remainder of

On The Assembly Line

BY W. F. SHERMAN

Detroit Editor

• Restriction of 20% in automobile production beginning Aug. 1 is an "edict" rather than voluntary action . . . Industry can do nothing but acquiesce but hopes curtailment will be applied gradually as occasion requires . . . Material shortages more serious.

this model year, it will be in a position to add 40,000 units to its quota for next year, as the curtailment regulation will be effective against only the top 20 per cent of its output.

The wording of the statement issued last Thursday by William S. Knudsen, OPM director, is significant. It follows:

"I have just concluded a meeting with the leaders of the entire automobile and truck production industries, which I called to consider the growing defense production problem that faces us.

"The entire industry willingly accepted an initial 20 per cent reduction in the production of motor vehicles for the model year beginning Aug. 1 this year, in order to make available more manpower, materials, facilities and management

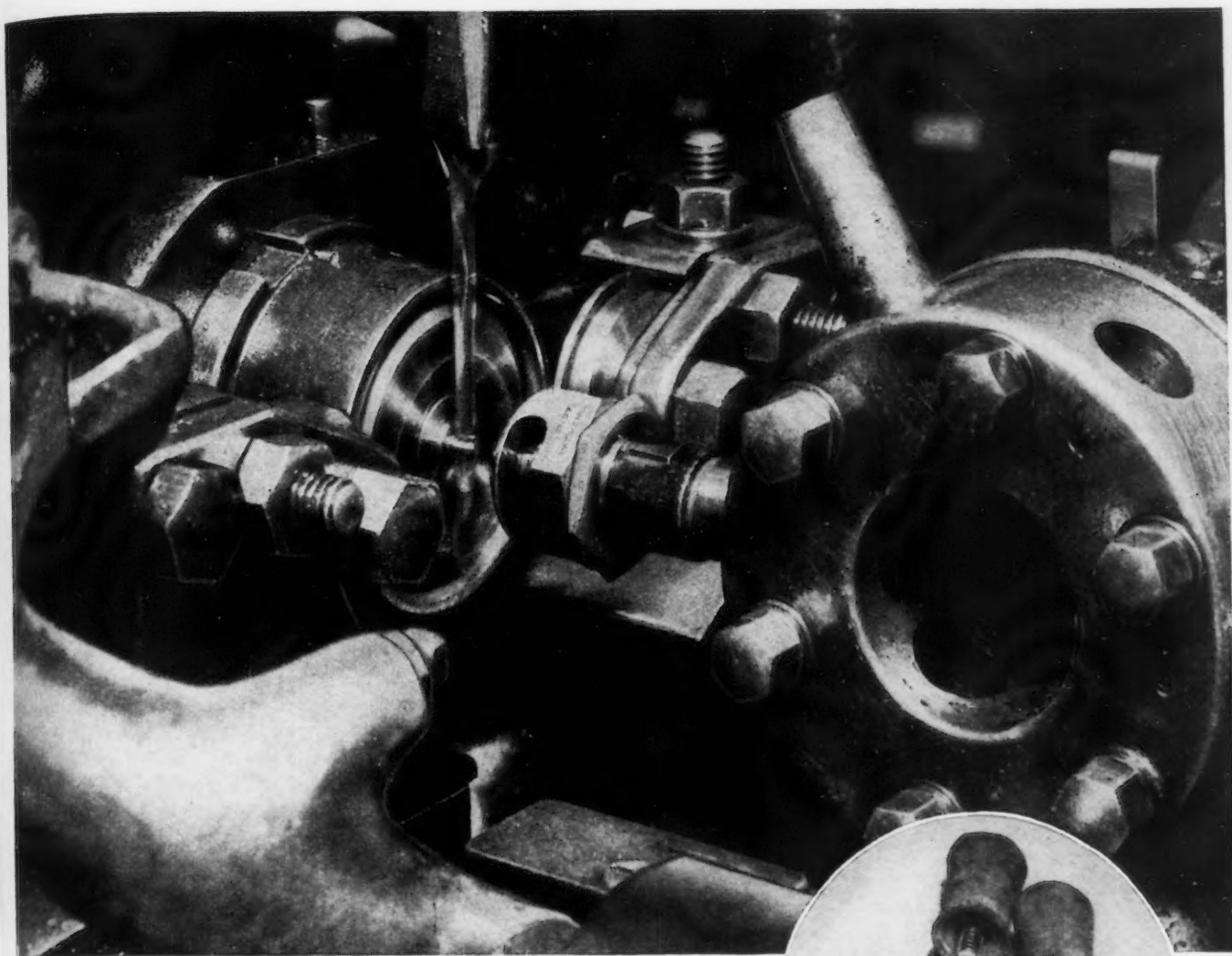
for the defense load now being made ready.

"The reduction amounts to approximately 1,000,000 units."

No more need be said about the "voluntary" nature of the action, since the industry's attitude was accurately reflected in this department on April 3 and 17. The industry cannot fight the curtailment; now that the edict has been pronounced, the industry can only hope that its application and interpretation will be tempered to conditions so men will not be laid off or plants made idle early in the model year unless there is need for the men or materials in the defense program. In other words, there seems to be no good reason for applying the restriction to each week's output in August, September, October, etc., or until the defense plants are ready to absorb the men and the materials. It can be made effective later in the model year without too much harm, perhaps. It is not likely that the defense plants in the Detroit area will be ready to absorb men until fall, at least.

Complete Cessation Had Been Suggested

There is a lot of significance in the exact wording of Mr. Knudsen's second paragraph in which he refers to "an initial 20 per cent reduction." Since last August or September, at least, the question of curtailment has been pressed seriously in Washington, and one Cabinet official is reported to have urged complete cessation of all automobile production last September, regardless of the fact that it would have thrown perhaps 700,000 men out of work with no good results. The subjugation resolution which the automobile builders signed at the Auto Show last year was a compromise move which Knudsen is believed to have initiated to avoid the more drastic action urged by other officials. So, too, it is believed that this 20 per cent reduction is a



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compromise evolved by Knudsen to avoid even more drastic action which had been proposed. It will free 100,000 to 140,000 men, it is estimated, and these will be ample to care for the defense production that is scheduled for early realization in this area. In fact, there is room for belief that, if all this labor is thrown out of employment in August or September, it will be extremely difficult to absorb it immediately in defense work in Detroit or vicinity.

Knudsen's estimate of a 1,000,000 reduction in automobile output places the 1941 model total at about 5,000,000 units. Since about 3,750,000 cars and trucks have already been built, this would indicate the probable manufacture of 1,250,000 vehicles by Aug. 1. This is conservative. A total of 5,250,000 (U. S. and Canada) is more like the industry's unexpressed goal. However, the ability to obtain materials will be the governing factor.

Difficult To Get Materials

Obtaining materials for the extra thousands of cars created a real flurry in Detroit last week. It proved to be a very difficult task for the purchasing agents since all suppliers are already well loaded up. Finding enough steel to make

thousands of extra cars proved to be the real problem. It does not appear, from investigation made in Detroit last week that any of the extra steel tonnage had been placed at that time. Ford, with its own steel mill, is probably better protected against the future than any of the other automobile companies. Also, the company is reported to have been buying slabs on the outside recently.

All of this calls to mind the statement which was attributed recently to Paul G. Hoffman, president of Studebaker. He said significantly that the industry would continue to make automobiles as long as it could obtain steel. At the same time, it was pointed out that substitutes could be found now for most requirements, but not for steel.

The government curtailment of next year's automobile production is apparently an attempt to anticipate conditions that might arise in the fall. Certainly the automotive projects have not lagged in any noteworthy instances so far. General Motors, for instance, is now in production on its \$61,000,000 machine gun order, months ahead of the planned production date, according to C. E. Wilson, president. Machine gun production lines are in operation at GM plants at

Saginaw and Flint and stocks of completed guns are being built up. In addition to the Saginaw steering Gear division and the AC Spark Plug plant at Flint, two other GM plants—Frigidaire at Dayton and Guide Lamp's Brown-Lipe-Chapin at Syracuse will produce machine guns. It should be noted also that these weapons are to be manufactured in specially tooled plants, not with regular automobile manufacturing equipment. The guns are 30 and 50 caliber Brownings.

Harlow H. Curtice, of Buick, in reporting on the progress of Buick's aviation engine manufacturing plant, reports that construction work on these is ahead of schedule, also. Chrysler appears to be well on the way to launching its assembly line for tanks and has already demonstrated and tested its first pilot model. This No. 1 tank will be shown to the press on April 24 when it will be presented officially to the Army.

The only instance of a delay in production of defense items is that reported from Toledo, where Willys Overland Motors, Inc., is having difficulty in getting machinery and material to produce \$8,000,000 worth of shell components for the Army, and is also experiencing difficulties with the design of its mid-get truck. However, both these defense orders are supposed to be in production in May. The trucks are due for delivery by June 20.

An overall picture of the role which the automobile industry has voluntarily assumed in the defense program has been prepared by the Automobile Manufacturers' Association. It reports that the industry has orders calling for delivery of approximately \$1,500,000,000 worth of finished airplane engines, tanks, machine guns and Army trucks and other military products.

A.G.M.A. Elects Michigan Tool

• • • Michigan Tool Co., Detroit, producers of cone-drive area contact worm gearing, gear cutting tools, and gear finishing, lapping and checking equipment, has been elected to membership in the American Gear Manufacturers' Association. The association, which will hold its annual meeting at the Homestead, Hot Springs, Va., May 5-7, now has 110 member companies.



Photo by International

MONTHS AHEAD of schedule, General Motors Corp. has started production on its \$61 million machine gun order, with four plants soon to turn out .30 and .50 caliber Brownings. (Effective range of the .50 caliber gun is above 4 miles.) In this photo K. A. DeLoria, left, civilian in charge of ordnance operation, and R. V. Keck, general superintendent, are examining the new guns at the new Saginaw, Mich., Steering Gear Division plant.

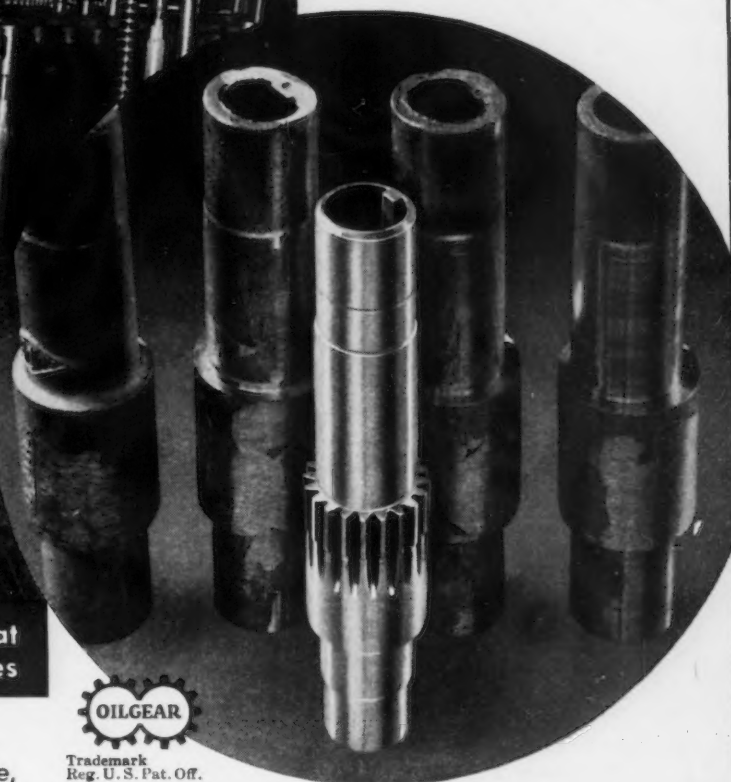
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WASHINGTON — Returning recently from a trip across the country, Senator Johnson of Colorado made an unusual statement to the Senate. He said that he had "never seen the American people so willing to be taxed." Noting this spirit of "willingness," as he called it, the Senator proposed a tax on all incomes. To make everybody tax conscious he would exact a toll from the smallest income, even if it were only a token tax. Everybody pays taxes, a multiplicity of them, on practically everything purchased. But many of these taxes are invisible, the delight of the politicians, and reduce the value of the dollar to about 80c. So, willing or not, the American people, from the smallest to the largest income groups, already are heavily taxed, though in the language of the street, they "ain't seen nothing yet."

The attitude of the American people toward being taxed, which Senator Johnson reported, probably is not so much a "willingness" to be taxed as it is a realization and a fear that unless it narrows the enormous spread between its income and outgo, the federal treasury is headed for the rocks. Even without the United States being an active participant in war, its defense expenditures alone exceed revenue by some 80 per cent. These costs, great as they are, would be vastly increased if this country gets into war. The American people evidently finally see that, if a crash is to be avoided, and sound credit maintained the government can no longer finance these costs by token payments.

The situation that lies ahead for this country, for taxpayers, corporate and individual, was presented to the Senate last week by Senator Vandenberg of Michigan. He outlined the highlights of a Treasury report—and had the report printed as a document—prepared by Assistant Secretary John L. Sullivan, and it carried some wallops that were worthy of Mr. Sullivan's fistic namesake, showing that these "huge" war profits of which so much is heard, will go into Mars' kitty.

U. S. On 20% Payment Basis

In his letter accompanying the report Mr. Sullivan pointed out that, whereas the United States theoretically at peace, is probably not on better than a 20 per cent pay-as-you-go basis, Great Britain, in desperate combat, was on a 40 per cent pay-as-you-go basis before its latest tax increases. Canada, at war, is on nearly a 50 per cent pay-as-you-go basis. Australia, at war, going almost the limit, is on practically a 100

Washington

BY L. W. MOFFETT

Washington Editor

• Fear of post-war crash deepens U. S. belief that taxes must be lifted to pay for defense . . . British are nearer to pay-as-you-go basis . . . Morgenthau sees third from borrowing, balance from taxes.

per cent pay-as-you-go basis.

Mr. Sullivan's letter, referring to the British budget estimates for 1940-41, shows revenues of £1,360,000,000 and expenditures of £3,466,000,000. Figures for Australia show revenues of £151,000,000 and—of all things!—a slight surplus. The Canadian budget, also for the same period, indicates a revenue of about \$650,000,000, ordinary expenditures of about \$1,148,000,000, a deficit of \$498,000,000, plus an indeterminate amount which may bring the figures of the deficit to \$700,000,000.

In the United States a married couple with an income of \$5,000 pays a federal income tax of \$75; in Australia the person similarly situated pays an income tax of \$1,052; in Canada, \$391; in the United

Kingdom, \$1,193. A married person in the United States with an income of \$20,000, with two children, pays a present income tax of \$2,143; in Canada he pays \$5,982; in the United Kingdom, \$9,426 and in Australia, \$8,584. In addition these British countries pay numerous other taxes, sales taxes, national defense contributions, excise taxes, luxury taxes, high excess profits and corporate taxes, etc.

Not a great deal is being given out about the forthcoming tax program. Nevertheless the government has decided to greatly increase taxes and revenue. Originally there was talk of raising it only \$1,500,000,000. This idea has been knocked into a cocked hat. Last Thursday Treasury officials and leaders in Congress agreed to raise an additional \$3,500,000,000. This will be done through new and higher taxes.

\$19 Billion Expenditure For 1941

Secretary of the Treasury Morgenthau said that the program contemplates financing of all government expenditures on the basis of two-thirds from revenue and one-third from borrowing. Estimated federal expenditures for the fiscal year 1942, beginning July 1, are \$19,000,000,000. Two-thirds of this total is \$12,667,000,000, and Mr. Morgenthau said that it would require a \$3,444,000,000 to carry out the ratio he wants fixed between revenue and borrowing. This will be the start of the pinch of war costs.

A proposal to pay learners in the enameled utensil industry a wage rate below the 40-cent minimum effective for the industry April 21 under the wage-hour law will be the subject of a public hearing called for April 28.

A reduction of 10 per cent in the coating of tin on cans could be made safely for about 95 per cent of all tin can uses, and with savings now being accepted by

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industries using cans would result in estimated savings of 5000 to 7500 tons of tin annually. Statements to this effect were made by representatives of can manufacturers to OPM officials at a meeting on Wednesday of last week. The can making representatives expressed the opinion that a 17 per cent reduction, which had been suggested, should not be made. Opposition was also expressed to any reduction in the weight of the coating of cans used for baby foods, kraut and high acid fruits, such as cherries. These products were said to fill about 5 per cent of the cans used in this country.

The conference of the tin can makers with Robert E. McConnell, chief of OPM's Unit of Conservation, was held almost simultaneously with OPM's release of a report of the Technological Committee of the National Academy of Sciences on the problem of tin conservation. Representatives of the companies reported that paint manufacturers were already switching from the use of tin-plated to terne-plated cans, with some exceptions. The can manufacturers said also that they were studying possible savings in many other lines.

Mr. McConnell in opening the meeting said that there is no emergency in tin. He explained that the conference had been called primarily for the purpose of advising the can manufacturers on the situation regarding the present and future tin supplies and to initiate preparation of plans which could be put into effect for the conservation of tin in the can making industry if an emergency should develop.

A-10 Aluminum Rating Given To Steel Plants

Washington

• • • Blast furnaces, steel works and rolling mills have been given an A-10 preferential rating under an aluminum index classification issued by the OPM Priorities Division. The classification will be used as the basis of aluminum shipment beginning in May by producers, fabricators and secondary smelters.

The steel industry was the only group to be given an A-class rating. The classification was re-

stricted to deoxidizing ingots, the quantities of which will not be limited under the percentage formula. The classification index lists industries by general categories, and affects the distribution of aluminum for all major civilian uses. However, the instructions said that products listed will take higher ratings than those indicated when defense orders are involved.

Under regulations previously issued customers whose orders fall into the non-military or B classes may receive only certain stipulated percentages of their average 1940 orders. For example, in the case of high-grade aluminum, these percentages range from 10 per cent for B-8 to 80 per cent for B-2. In the case of low-grade aluminum, for which there is little defense use, the percentages range from 50 per cent for B-8 to 100 per cent for B-2. Defense orders generally bear ratings in the A class.

Other preference ratings assigned:

Iron and Steel products, all uses other than for deoxidation, B-8; iron and steel foundry products, B-4; Tin cans and other tin ware—nails, tacks, rivets, B-4; all other uses B-8; cutlery, tools and hardware, B-8.

Automobiles and automobile equipment B-4; Aircraft and parts, B-8 (for civilian uses); communication equipment and related products, generally B-7; electrical appliances, including washing machines, vacuum cleaners, B-7; refrigerators, B-7; evaporators, grids, and air-conditioning equipment, B-8.

The lowest rating assigned, B-8, as a general thing was made applicable to products in which reasonably satisfactory substitutes for aluminum can be made available.

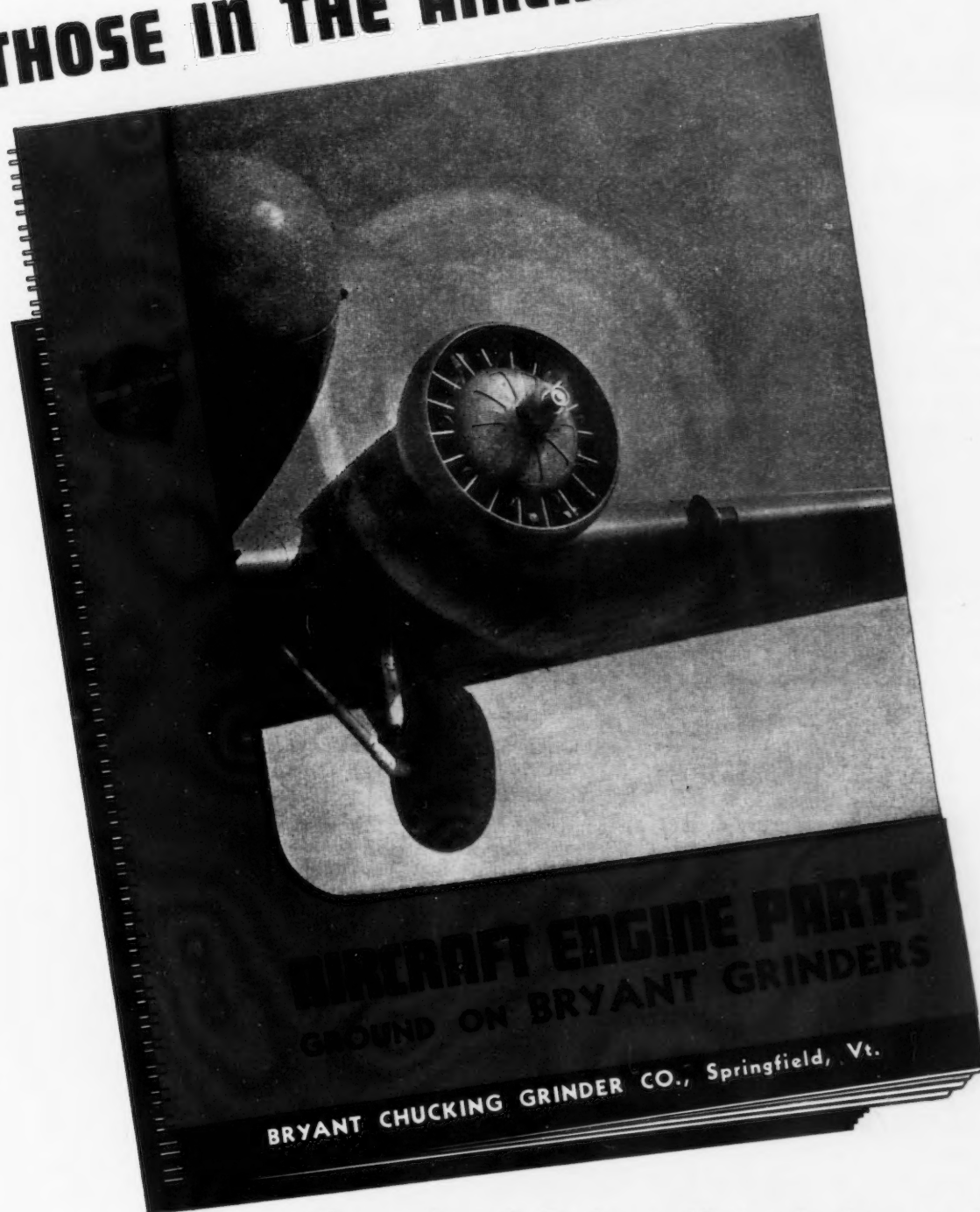
Since the March 21 order, which placed aluminum suppliers under a general preference order and schedule of preference ratings, suppliers have been fitting their customers into these preference classes. The latest classification index is designed to regularize the classification orders throughout the industry.

THE BULL OF THE WOODS

BY J. R. WILLIAMS



FOR THOSE IN THE AIRCRAFT INDUSTRY

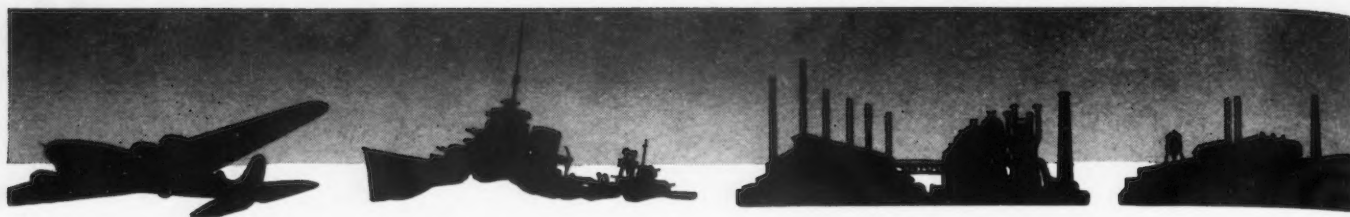


The new Bryant Aircraft Catalog is filled with photos and line drawings showing Bryant Internal Grinders used in the production of aircraft engine parts. It also shows how the Bryant feature of single slide and three point control assists in meeting the exacting requirements of the Aircraft Industry in its National Defense Program. A request on your company letterhead will bring your copy without obligation. Just write—

BRYANT CHUCKING GRINDER CO., Springfield, Vermont

THE IRON AGE, April 24, 1941—77

ON THE WEST COAST



SAN FRANCISCO — West Coast steel users need no crystal ball to envision fundamental changes in the region's industrial economy as a result of increasing pressure to divert inter-coastal ships to transpacific or other foreign service. Not the least important of these changes—now classed somewhere between possibility and probability—is eventual higher steel prices for most users, government administrators notwithstanding.

Present Pacific Coast steel prices for the most part are built up by the addition of water or rail-water freight to Eastern base figures. Customers desiring all-rail shipments, and there are beginning to be more of them, must pay the differential in cost over the standard method of shipment. If vessels are withdrawn from inter-coastal trade, either voluntarily or as a result of emergency decree, to the extent that water transportation becomes impractical for most items customers would have no choice but to foot the bill for rail shipment.

Reports from Washington last week that British Minister Neville Butler and Australian Minister Richard Casey had laid before Under Secretary of State Sumner Welles a plan for American ships to take over Britain's transpacific shipping route brought such unpleasant thoughts into renewed prominence.

Ship Shortage Cuts Defense Shipments

Certainly not many British ships would be freed for Atlantic service by this move, for the Union Jack has all but disappeared from West Coast-Orient service. Nevertheless, it is no secret that a shortage of bottoms on the Orient run is slowing up the shipment of defense and other materials from the Far East. Ships—not the available supply of raw materials—constitute the rubber industry's foremost problem, John L. Collyer, president of the B. F. Goodrich Co., stated recently

• Diversion of inter-coastal ships suggests higher Coast steel prices . . . All-rail shipments increase substantially on defense steel . . . San Francisco machinists' strike spreads . . . Coast plants to build 112 "ugly duckling" engines . . . Far-western aircraft companies increase factory area 42 per cent since Jan. 1.

in Los Angeles. Already, rubber is being unloaded on the West Coast and shipped across the continent by railroad to make as much tonnage as possible available for transpacific trade. Shifting of vessels from the East and Gulf Coast-Orient trade to the transpacific trade, and the extension of inter-coastal runs to include service to the Orient are steps in the construction of inter-coastal cargo space.

Over 30 ships already have been lost entirely to the inter-coastal run either through sales to foreign interests or through charter to operators on other routes. Last week Luckenbach Steamship Co., operators of a fleet of 18 modern inter-coastal freighters, announced the extension of this service to the Orient. Negotiations have been carried on for some time between officials of inter-coastal lines, transpacific operators and the Maritime Commission to insure the flow of defense materials to America, and it is unlikely that domestic shippers will be treated with consideration when other means of transportation are open to them.

Vessels Subject to Requisition

Ships in government subsidized operations are subject to requisition at any time. The two major

steel lines, Isthmian and Calmar, are not immediately threatened, but if a national emergency were declared, the entire merchant marine would be in government hands. This latter prospect is an effective Damocles' sword over the heads of all ship operators.

From the standpoint of strict probability, even under government control, it is unlikely that all steel items would be banished from inter-coastal water movement, particularly those heavy items needed for national defense, but with bottoms at a premium in foreign trade some customers would certainly suffer. Most Coast shipping circles believe that such a situation will precede American involvement in war by some time.

Railroads already report a tremendous increase in steel tonnages, most of it destined for military and defense industry projects. In the latter category is over 2000 tons of shapes for the new Reynolds Metals Co. plant at Longview, Wash. Large plate tonnages, to get the shipbuilding program under way as rapidly as possible, are moving by rail. The higher price ceiling for fabricated structural steel is permitting Mid-western fabricators to take advantage of f.i.t. rates on a more favorable basis than prior to the boom.

New Plants a Possibility

How far reaching the implications of curtailed inter-coastal water shipments may be, depends only on the extent to which you are willing to let your imagination ramble. For instance, some industries which have found it cheaper to manufacture in the East and ship by water to Pacific Coast markets may have their margin of benefit reversed, and find that the increased cost of rail over water shipment makes it to their advantage to establish Coast manufacturing plants. In general, new plants mean new demands for steel. The big steel customers will find it even more to their advantage to be

near the source of supply, but there may well be many plants in the marginal classification who use sizable quantities of miscellaneous steel among them. Remember, that it is the miscellaneous consumer industries who will feel the pinch in inter-coastal cargo space before heavy goods and steel firms who operate their own shipping lines.

Government agencies which have been standing on shaky ground in urging an expanded West Coast steel industry will be quick to point out that the higher delivered cost of steel moving entirely by rail strengthens the economic basis for their contentions. If the traffic diversion assumes any degree of permanence this problem will have to be examined in a new light. The rush of electro metallurgical operations announced on the Coast since the first of the year may well be symptomatic.

Pacific Coast fabricators who have contended that steel items which are rolled on the Coast should reflect Coast costs rather than Eastern costs plus freight will have fuel dumped in their bunkers, but in the period of capacity operation it is doubtful whether they will add it to the fire.

Strike Closes Caterpillar Plant

Turning from speculation on future worries to present problems, the strike of 1500 members of AFL Machinists' Union Local 68 at San Francisco reached the contagious stage last week when 640 members of Local 284 closed the Caterpillar Tractor Co. plant across the Bay at San Leandro. The San Leandro plant produces fuel injectors for diesel tractors. Meanwhile the San Francisco union was pondering whether or not to accept a request from the National Defense Mediation Board that it send a representative to Washington for a conference Tuesday, April 22.

Random sparks from the wage agreement welded between Bethlehem and the CIO flared up at the company's Alameda, Cal., fabricating plant. AFL, claiming jurisdiction over crane operators, placed pickets at the plant. CIO workers, happy with the wage increase, ignored them, and full scale operations continued.

Maritime Commission last week allotted to Coast plants 122 engines for "ugly ducklings" cargo vessels.

Joshua Hendy Iron Works, Sun-

nyvale, Cal., an affiliate of the far flung Kaiser-Todd-Six Companies interests, will build 112, and Astoria Marine Iron Works, Astoria, Ore., will build 10. It is perhaps significant that only 62 "ugly duckling" vessels have thus far been contracted for on the Coast and the engine award strengthens the assumption that more ship contracts will follow as fast as facilities are made available.

Plane Factory Space Up 42%

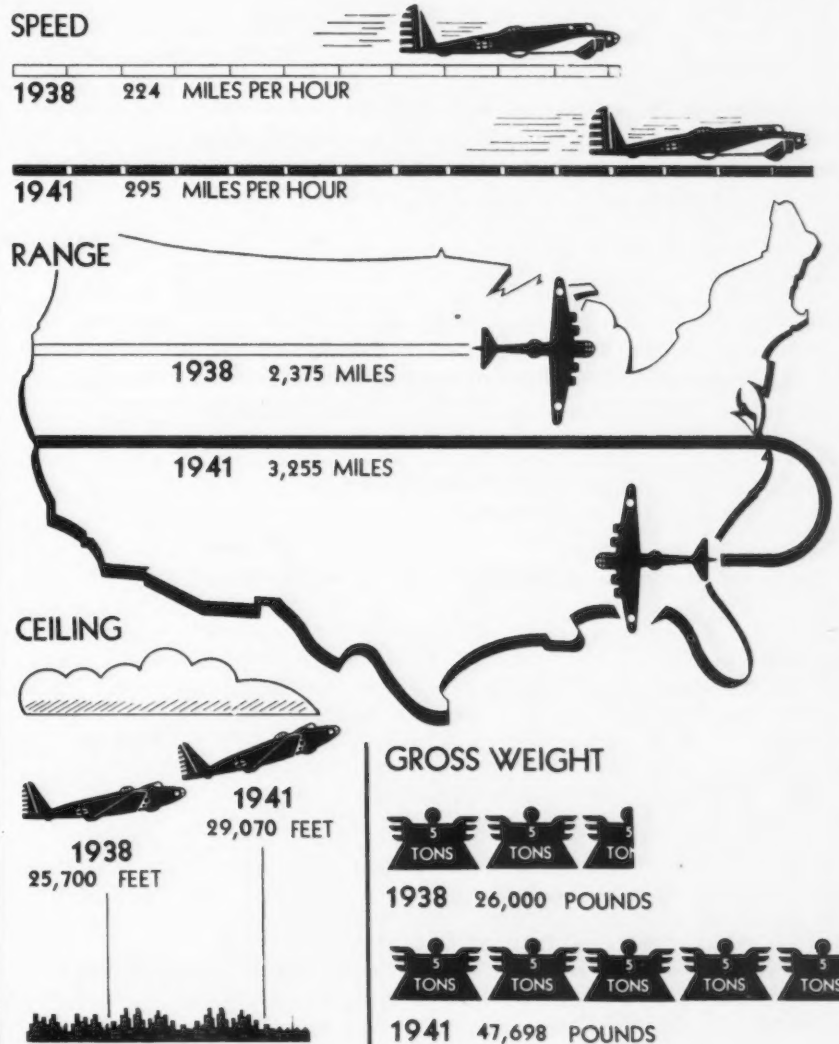
Pacific Coast aircraft companies have added nearly 4,000,000 ft. of

floor space in the first three months of 1940, according to the Aeronautical Chamber of Commerce. This means an increase in factory area of 42 per cent since the first of the year and of 150 per cent over January, 1940. Nine companies with headquarter plants in California and Washington had a total of 12,798,657 sq. ft. of working space at the end of March, compared with 8,993,339 sq. ft. on Jan. 1, 1941, and 5,116,000 sq. ft. on Jan. 1, 1940.

At Seattle, Boeing Aircraft Co. had nearly completed plant addi-

[CONCLUDED ON PAGE 114]

BIGGER, FASTER BOMBERS ROLL FROM U.S. PLANTS



Since 1938 the average maximum speed of American-built bombing airplanes (all types) has increased 71 miles per hour. Average maximum size has almost doubled. Average maximum range has been increased nearly 900 miles. Average service ceiling is 3,300 feet higher.

Source: AVIATION NEWS COMMITTEE
Aeronautical Chamber of Commerce of America



Fatigue Cracks

BY A.H.DIX

There is a Destiny . . .

••• We see by Printers' Ink that a book on the silk screen printing process has been written by J. I. Biegeleisen and E. J. Busenbark. Each of these names is impressive in its own right, but combined they are awe-inspiring.

Biegeleisen and Busenbark. It calls for a symphony, with cello and brass sections doing the heavy work. We can't believe that mere chance brought Messrs. Biegeleisen and Busenbark together. Their meeting was foreordained.

Another name that strikes our fancy is that of the Uff Machine Co., Upland, Pa. Uff is unusual. You wouldn't think there would be a chance in a million of its being hooked up with *stuff*. But according to the government awards list on page 94 of the April 10 issue, the Uff Machine Co. got an order for \$17,112 worth of stuffing tubes. Somehow we find this deeply satisfying.

Triangulation With Forcing Two-Bid

••• A name that we have been wondering about for a long time is the Weems System of Navigation, Annapolis, Md. We saw it listed some place and marked it down, and every time we go through our grab bag and see it our curiosity is aroused almost to the point of writing to the Weems people to find out what it is all about.

We had an idea that, unlike bridge, navigation was an exact science, with only one system, but apparently it can be played several ways. Maybe Lt. Commander A. R. Simpson, U.S.N., Newport News, who solved the difficult ladder-and-alley problem with one hand tied behind his back, can enlighten us.

Copper Evicted From Metal Kingdom

Frigidaire and Electrolux refrigerators are coming out with their full complement of ice trays, tinned copper being substituted for metal.—*New York Times*.

There was some talk of using Bakelite instead of plastics.

Paradox

••• As the imminence of our entrance into the war increases, American industrial advertising becomes more and more serious in tone, while oddly enough in England industrial advertising is becoming more and more light-hearted. There is probably some sanity-saving psychological reason for this, but we are concerned only with the use of humor as a sales aid. It is deadly unless handled with a sure touch, and from what we have seen of their work, the English have that touch.

As an example, in a recent advertisement the Reynolds Tube Co., Ltd., maker of aluminum alloys, pats itself gracefully on its corporate back for its contributions to the R. A. F.'s success in making long flights, and introduces its sales talk with this:

"Two persons seem to think the R.A.F. is going 'too far' by miles, and are getting Ducedly Fuehrrious about the 'Hints' constantly being dropped on their domains."

And Delights the Eye

Speaking of names and the English, the other day in checking the membership list of an American technical society we ran across the most poetic street name we have ever seen—*Page Moss Parade*, Huyton near Liverpool. It caresses the tongue.

Joke

In your recent article on armored plate, reference was made to an Egyptian ewer. Were you correct in referring to it as "a ewer" or should it have been "an ewer?"

I should also like to know if anything is known of the purpose for which this ewer was intended? Somehow, I like to think it was for the use of the Egyptian cavalry, because obviously that would make it a horseman ewer. —Deac.

(1) "A ewer" is correct; (2) the ewer was used in connection with *connois*, Egyptian for ablutions. Thus we get *connoisseur*.

Wire-Haired Sheep

We see, too, that someone else got an order for \$656 worth of hydraulic rams, reminding us to disinter the old gag that these are what steel wool is sheared from.

Short Approach

"Whitey" Maurath, our favorite philosopher, says:

"The funny thing about speculation is that a thousand dollar paper profit looks like a trifle, whereas a thousand dollar cash loss will drive a man to drink . . ."

That isn't a drive. With us it's just a niblick pitch.

Alliterative Gem

"If the time comes when we have to choose between money for books or boots, or between magazines and milk, then we shall have to choose boots and milk . . ."

—*The Chancellor of the Exchequer in an address before the British House of Commons.*

If it comes to a toss-up between us and Borden's Elsie, we'll leave the field to Elsie. But may we remind the Chancellor that man does not live by boots alone.

Mystery Solved

••• Our guess that a poidometer is an Irish pedometer is wrong. R. A. (Diamond Chain & Mfg. Co.) Schakel enlightens us:

A poidometer is a continuous automatic weighing machine. It consists of a traveling conveyor on knife-edges and hooked up to a scale beam so that the load on this particular section of the conveyor can be weighed. The weighing machine is designed only for handling loose materials of fairly uniform size and these materials are fed on to the conveyor belt through a hopper.

Furniture Dept.

••• We misinformed you about the derivation of the word *bench*. It was not a spontaneous invention. L.W.A. tells us it comes from bank. According to him, Anglo-Saxons were fond of sitting on the banks of streams, so their legs could dangle. Then a genius invented a portable *bank*, which, by slow degrees, was corrupted to *bench*.

A long time after that the ultimate in luxury was attained by adding a back to the bench. This repose for the backbone made the Anglo-Saxons so happy that they called it a *chair*, which, if you are still with us, is really a corruption of *cheer*, so he says.

Puzzles

••• The moving quarter in last week's puzzle goes around the fixed one twice.

One-eighteenth of our public says we shouldn't print any problem that requires a considerable acquaintance with mathematics. But the master minds sneer at the easy ones and call for head-scratchers. So we will probably continue to do as we have been doing, that is, to run some easy ones and some hard ones.

The difficult April 10 problem, the one about the carpet, was nothing at all to Robert T. (Pittsburgh Tool Steel Wire Co.) Griffiths.

If you can see through this one in 5 sec., mark an A on your report card:

A man starts out to travel two miles in his automobile. The first mile he goes at the rate of 30 miles per hr. What rate of speed must he maintain for the remainder of the distance in order to average 60 miles per hr. for the entire trip?

News of



ROLLING OUT THE TANKS: In this Berwick, Pa., plant of American Car & Foundry Co., M-3 light combat tanks in a \$70 million Army order are shown coming off an assembly line.

Photo by Wide World

Industry

Little Steel Displaced By Plastics' Institute Committee Reports

••• Displacement of steel by plastics so far is of minor consequence, and the steel industry as a whole has benefited by development of the plastics industry due to its requirements of steel for new plants and equipment, an American Iron and Steel Institute committee has just reported.

During 1939, the total tonnage of plastic material produced was one three hundredth of the steel produced that year and probably less than one four-hundredth of that amount superseded steel.

This conclusion was reached by a sub-committee of the institute's Committee on Manufacturing Problems following visits to major plastic producing and consum-

ing plants, including the Ford plant, where experiments on use of plastics in automobile bodies have received wide publicity.

Applications in which plastics may become a direct threat to steel tonnage, the institute group says, include automobile bodies, refrigerator liners and containers. It adds that activity of the plastics industry "will undoubtedly cause radical changes, which through new materials, new processes and lower costs, may result in entirely different relationship between plastics and steel other than those existing today.

The steel group, which included W. O. Clinedinst, National Tube Co., F. C. Elder, American Steel & Wire Co., E. D. Martin, Inland Steel Co., Charles Schenck, Bethlehem Steel Co., J. J. Strachan, Carnegie-Illinois Steel Corp., R. M. Bowman, Republic Steel Corp., and (chairman) L. H. Underwood, Youngstown Sheet & Tube Co., reported principal steel articles which might be replaced by plastics are:

Automobile parts, automobile

heaters, agitators, bottle closures, building hardware, conduit boxes, containers, electrical devices, lamp guards, pump parts, gears, helmets, office equipment, moldings, reflectors, small stampings, tote boxes, and cases for adding machines, clocks, cameras, gauges and teletype.

Aluminum articles replaceable by plastics include vacuum cleaners, washing machine parts, kitchen ware, lamp guards and fishing reels. Bronze products being replaced include bearings, gaskets, lighting fixtures, pump parts, automobile heaters, building hardware and spray nozzles, while plastics are replacing zinc for some ornamental and die casting use, according to the institute committee. It says:

"Going back to the question of whether or not the steel industry is being aided by the development of plastics, we wish to call particular attention to the large and growing tonnage of steel products of all kinds, entering into the manufacture of all plastic materials, both competitive and non-competitive with steel.

The committee reports it "cannot predict the outcome of the latest Ford experiment" (in plas-

tic bodies) and gives this summary of its latest information regarding Ford plans:

"Ford definitely intends to build plastic bodies, at least on an experimental scale. Present plans call for a body-frame made of steel tubing, covered with plastic panels of medium size. The plastic to be used is expected to be of phenol formaldehyde with a wood pulp and vegetable fibre filler, made in the same way as the present tractor seat. Construction is planned to be such that plastics will not be stressed by body weaving. It is proposed to apply a finish over the plastic, not to depend on its natural finish. Satisfactory weathering properties are reported attained. Molding cycle time and the number of presses required are to be minimized by stacking molds three or more high in each press.

"The use of preforms made from resin-impregnated wood pulp reinforced with fibers necessitates a considerable plant investment but facilitates molding and mold loading.

"The Ford program, though admittedly well back in the experimental state and still involving many problems, is well thought out. No data on relative costs are available. Considerable weight savings are claimed with about 60 per cent of the total weight in a steel structure intended to serve both as a body frame and as a chassis frame. The tubular body-frame is supposed to weigh 225 lb., the plastics 150 lb. and a total of 150-200 lb., less total body weight than the present all steel frame and body. Molds are said to be on order and it is planned to have experimental bodies available for test within a few months."

The greatest of any one type of substitutions of plastics for steel is molded plastic caps for bottles, the institute report says.

Machinery Control Extended

Washington

••• Construction and conveying machinery together with certain types of mining, well and pumping machinery have been subjected to immediate export control.



Photo by Wide World

PRICE FREEZERS: Members of the new Office of Price Administration and Civilian Supply are, seated, Harriett Elliott, in charge of consumer relations, and, right, Leon Henderson, all-powerful Price Administrator. Dave Ginsburg, top left, is general counsel, and John Hamm, top right, is Deputy Price Administrator.

Ceiling Prices For Steel Announced By Leon Henderson

Washington

••• The first important action taken by Leon Henderson following his appointment by President Roosevelt as head of the newly-created Office of Price Administration and Civilian Supply was the issuance of an order freezing prices of steel products at their March 31 level.

This announcement was issued for publication on Thursday, April 17, and obviously was an attempt to head off price increases which were being considered by some of the steel companies in an effort to compensate, in part at least, for the wage increases of 10c. per hr. which had generally been put into effect only a few days before.

Mr. Henderson pointed out that a steel price increase at this time "might touch off a general increase in the cost of living and start the country off on the road to price inflation."

He made it clear, however, that the price ceiling on steel products is not necessarily fixed for an indefinite period. He left the door open for the submission of statistical proof by members of the industry that the present level of prices will work a hardship on them in view of the large increases in costs brought about by the higher wage level.

A thorough study of prices and costs in the steel industry will immediately be made by the Office of Price Administration and Civilian Supply, Mr. Henderson announced, and he added that "adjustments in the schedule will be made if these studies indicate that they are necessary." Individual steel companies are also making their own studies, and when these are completed they will be presented to the Price Administrator, presumably with recommendations as to what prices should be advanced.

In further discussion of the fact that no set period is implied in the price ceiling order, Mr. Henderson said: "The action taken today to freeze steel prices at levels prevailing during the first

Coming Events

- April 23 to 25—Concrete Reinforcing Steel Institute, annual meeting, Hot Springs, Va.
- April 23 to 25—Open Hearth and Blast Furnace Committees, American Institute of Mining and Metallurgical Engineers, annual meeting, Chicago.
- April 28—Association of Iron and Steel Engineers, annual spring conference, Youngstown.
- April 28 to 29—American Zinc Institute, annual meeting, St. Louis.
- May 1 to 2—The Galvanizers Committee, annual spring meeting, Pittsburgh.
- May 8 to 9—National Metal Trades Association, annual convention, Chicago.
- May 12 to 14—American Steel Warehouse Association, annual meeting, Los Angeles.
- May 19 to 23—American Society for Metals, Western Metal Exposition and Congress, Los Angeles.

quarter of 1941 should not be interpreted as fixing summarily a price ceiling for the duration of the emergency, or for any set period. Rather, it is an effort designed to be as helpful to the industry and its customers, of which the federal government is the largest, as to the economy in general. Today's action establishes, if you like, a cooling off period during which the effect of the defense program upon the industry and its cost factors may be rationally appraised.

"Estimates and guesses are not enough when the nation's welfare may be at stake. This action also forecloses arbitrary or precipitate action on the part of any member or group of members of the industry looking toward price boosting, and eliminates premiums for advanced delivery which a few companies have already begun to exact.

"We are immediately taking steps to resolve the prevailing uncertainties as to cost factors, production requirements and distribution, both as to defense and civilian needs. Meanwhile, prices should not be advanced.

"If facts are developed which show that an increase might be warranted, the necessary adjustments can be made.

"It cannot be too strongly emphasized that any steel price increase can now put us on the road to a series of economic maladjustments having their climax in a disastrous inflationary movement.

"A rise in steel prices would inevitably be followed by rises in prices of every other basic commodity. These increases would in turn be reflected in rising prices of manufactured goods. Presently the ultimate consumer would find that he must pay more for what he buys, and so the foundation would have been laid for a dangerous upward spiral of prices in general—which would mean, briefly, boosting the cost of living."

Stating that there has not been time for accurate measurement either of production or distribution factors in the steel industry, Price Administrator Henderson held open the door for proof by the industry of the necessity of some price increases. Under the



Photo by International

HARD TO UPSET: This truck, protected by steel plates, is one of a number which will be used by Weirton Steel Co., Weirton, W. Va., to keep its plant gates open in case of a strike. The trucks are to operate on company ground only and may be utilized if and when miners from nearby coal towns are brought in to mass picket the plant entrances through which steel workers will pass to their jobs.

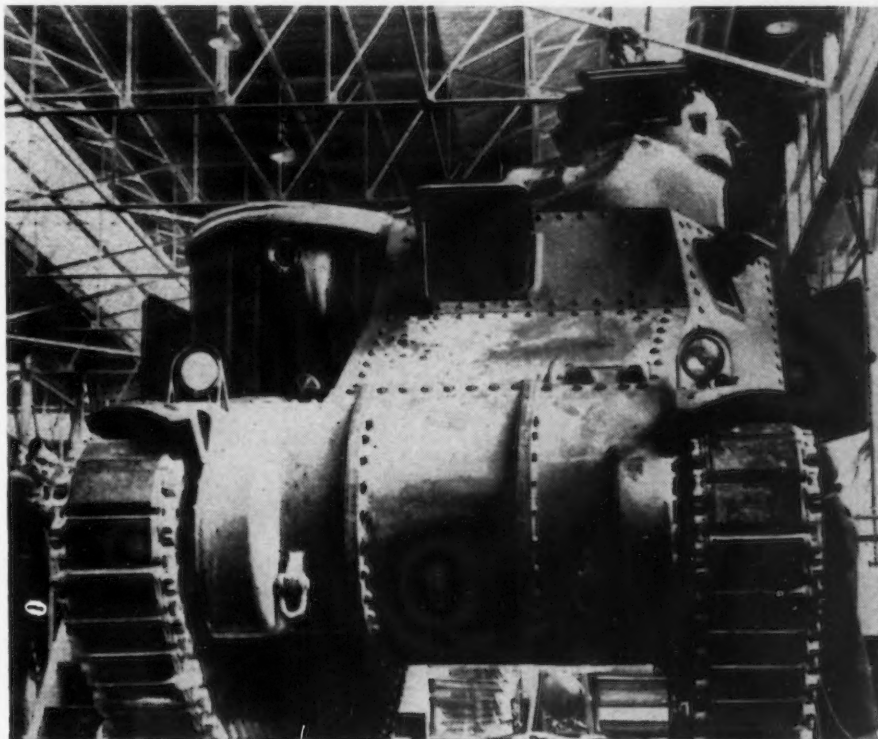


Photo by International

LARGEST TANK EVER BUILT IN THE U. S.—This M-3 28-ton tank, armed with a 75 mm. cannon and 37 mm. machine guns, was displayed April 19 at the Chrysler Corp. tank plant at Detroit. On the same day a similar tank was completed at the American Locomotive Co. works at Schenectady, N. Y.

circumstances it is believed that present prices may carry through the remainder of this quarter at least and that third quarter prices will be a matter for later adjustment on the basis of reports which

will be submitted to the Office of Price Administration.

He declared that price increases cannot reasonably be justified at this time, adding that, although published base prices have re-

maintained unchanged, extra charges have increased. He also cited the fact that certain contracts have contained escalator clauses which enable producers to add certain additional costs to contract prices.

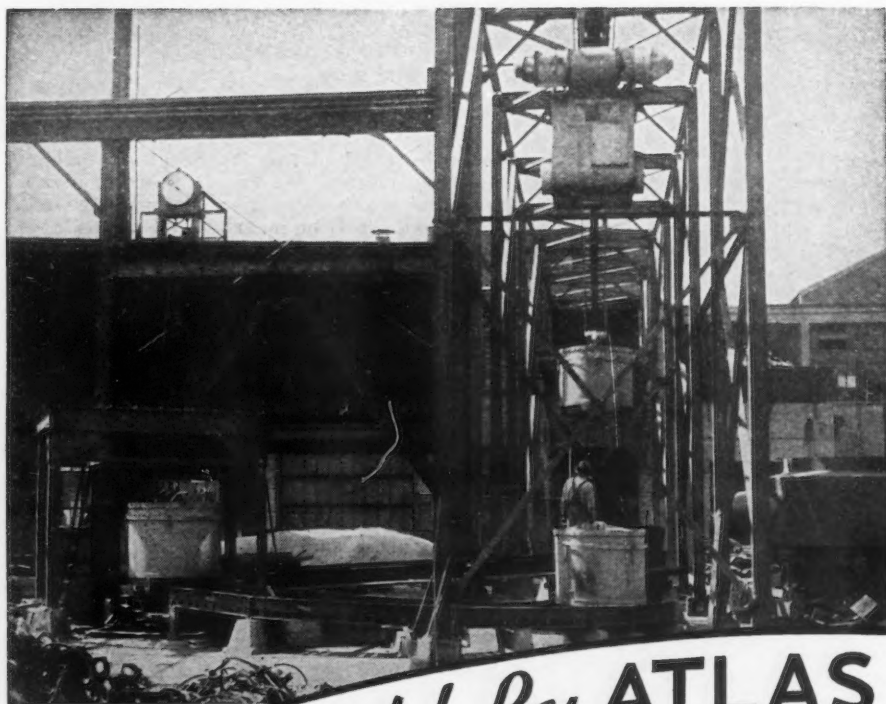
In fixing ceiling prices, Mr. Henderson explained, the Office of Price Administration and Civilian Supply made use of the steel industry's existing basing point,

price leadership and extras system. Thus the first quarter price for a given type of steel product is simply the sum of three things—the basing point base price, extras, and transportation charges. For products on which there are no base prices, the ceiling price is to be the price as of March 31, 1941.

The schedule provides that price

First Quarter Building Highest Since 1929

• • • March construction contracts, with a dollar volume of \$479,903,000 in 37 Eastern states, increased 76 per cent over March, 1940, and ended the largest first quarter since 1929. In the first three months of 1941, according to the F. W. Dodge Corp., building and engineering contracts awarded amounted to \$1,055,481,000, as compared with \$668,943,000 in the first quarter of 1940, and \$1,252,330,000 in the first quarter of 1929. Non-residential building showed an increase of 110 per cent, and residential building 37 per cent, over the corresponding period of 1940. Public works and utilities construction was up 36 per cent.



An Assist! By ATLAS

View at Prominent Iron Foundry

To Lower Costs!

Here Atlas - designed, Atlas - built equipment moves heavy scrap and other charging materials with consummate ease.

Monorail deposits empty bucket on roller conveyor. Bucket rolls down to scale platform, is charged with iron, weight read from yard crane cab. Scale platform lowers, turns, bucket rolls down to monorail for pick-up and charge to cupola.

A propitious circle, presaging profit at the year-end—and a definitely typical Atlas installation.

THE ATLAS CAR & MFG. CO.

Engineers

CLEVELAND, OHIO

Manufacturers

serving the world with mobile handling equipment

ceilings may not be evaded by additional charges for prompt delivery, or by other direct or indirect methods. Contracts entered into before issuance of the price schedule, containing "escalator clauses" which might send prices above the ceiling, may be carried out unchanged.

The schedule requires manufacturers to retain copies of all invoices, dated Jan. 1, 1941, or later, relating to sales to warehousemen, jobbers, brokers and all other persons purchasing for resale. The order further states that reports on such sales will be required by supplements to the schedule.

"If the information gained through this procedure and from other sources reveals that middlemen in the industry are profiting inordinately at the expense of consumers of iron and steel products, further action will be taken to remedy the abuse," Mr. Henderson asserted.

The price schedule, Mr. Henderson said, was issued after it had been submitted to and considered by the Price Administration Committee.

Interpretations of some of the obscure features of the price stabilization plan have been obtained by THE IRON AGE from the Office of Price Administration. One is that the announcement does not apply to pig iron. While it is possible that a ceiling on pig iron prices may also be pro-

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These resources meet today's challenge for increased production to complete America's program of defense—with steel.

Steel mills specify equipment that's built to take it, stand the load of high speed production—equipment that will enable them to keep schedules. That is why there are more Cromonite Rolls and other Continental Steel rolls on the job today than ever before.

In addition to rolls, Continental also manufactures rolling mill and heavy defense equipment. Their foundries produce castings weighing from 1 pound to 250,000 pounds, which include Carbon Steel, Alloy Steel and Cast Armor. Also complete facilities for Heat Treating.

4 Strategically located plants are operating 24 hours a day to meet delivery dates on schedule.

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ROLL & STEEL FOUNDRY COMPANY
CHICAGO • PITTSBURGH



CROMONITE ROLLS
PIONEERED BY CONTINENTAL FOR HIGH SPEED STRIP MILL OPERATION

claimed, nothing definite has yet been done.

At present there are two sets of prices on pig iron. Some producers advanced prices \$1 a ton, but others did not do so. Even under a price ceiling there might be nothing inconsistent in this arrangement, as the steel price schedule provides that something of the kind could also exist in steel prices if it were proved by cer-

tain steel companies that adherence to present prices would work an undue hardship on them.

Steel prices that have been increased since March 31 will have to go back to the level of that date. This ruling applies to changes in extras or discounts.

(Other comments on the price situation will be found in the market reports of this issue.)

2000 Workers Get Draft Deferments

Cleveland

••• Reports from the steel, machine tool, aircraft parts and other industries here show very favorable relationships existing between the firms and the 50 draft boards of Cuyahoga County. Only a few isolated cases have been the subject of complaint and these are almost entirely from small plants.

Draft officials estimate that barely 2000 registrants have been

Could YOUR chains do
**DOUBLE
DUTY**
after 10 YEARS'
SERVICE?



Especially important in this era of "rush-orders" is strong, dependable equipment

These chains used in pickling steel tubing are 2 of 75 in use in a Pennsylvania plant. After 10 years' service in 6-8% sulfuric acid at 180°F., two Monel chains handle 4 to 5 tons of tubing... will handle twice that load!

Write for full information on Monel chain and other pickling equipment. Address:

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5 ADVANTAGES offered by MONEL CHAIN

ECONOMY... Monel chains last longer than others, cost less in repairs and maintenance.

STRENGTH... Monel remains sound and resists corrosive attack.

FEWER SPARES... Extra chains not needed to make up for those out for repairs.

POSITIVE INSPECTION... A pin hole on surface of some chains may mean a cavity underneath, but not when they're made of Monel. External diameter represents strong, usable metal.

SCRAP VALUE... Exceptionally high for Monel chain and other pickling equipment.

"Monel" is a registered trade-mark of The International Nickel Company, Inc., which is applied to a nickel alloy containing approximately two-thirds nickel and one-third copper.



Photo by Harris & Ewing

PUBLIC OPINION WILL force a settlement of labor strife in defense industries, hence legislation to curb defense strikes is not needed at this time, Donald M. Nelson, above, OPM Director of Purchases, told the House Military Affairs Committee.

deferred to date in the county because they are needed in industry. About one-half of the 161,000 registrants have been classified.

Out of its total payroll of 62,000 employees, Republic Steel Corp. had lost only 433 to the draft up to April 1. National Acme lost

McKAY

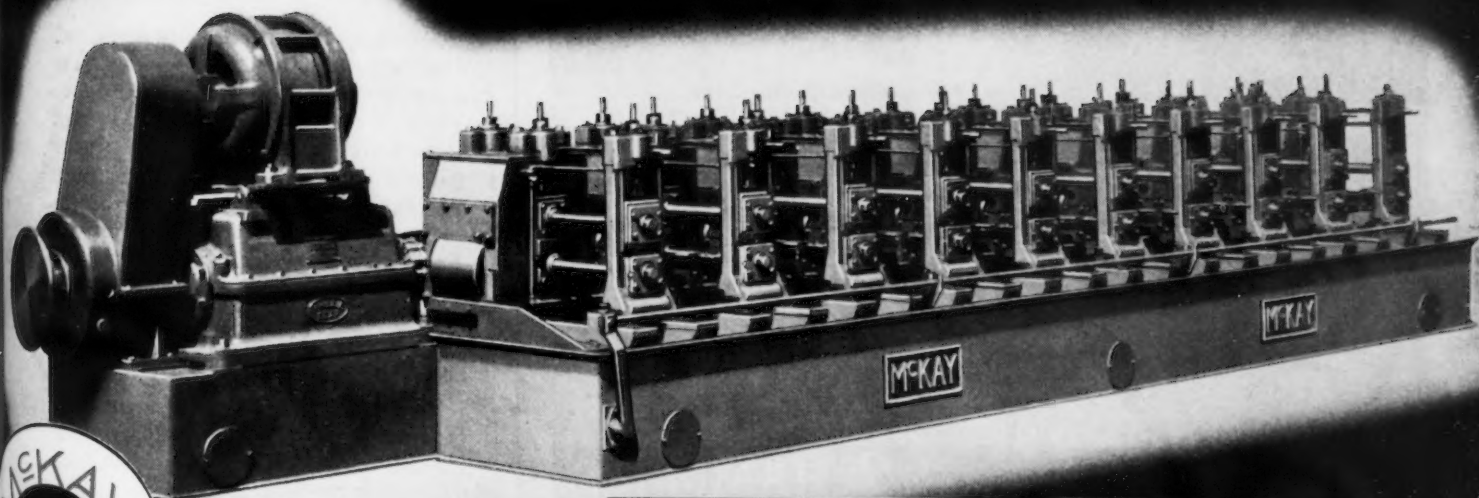
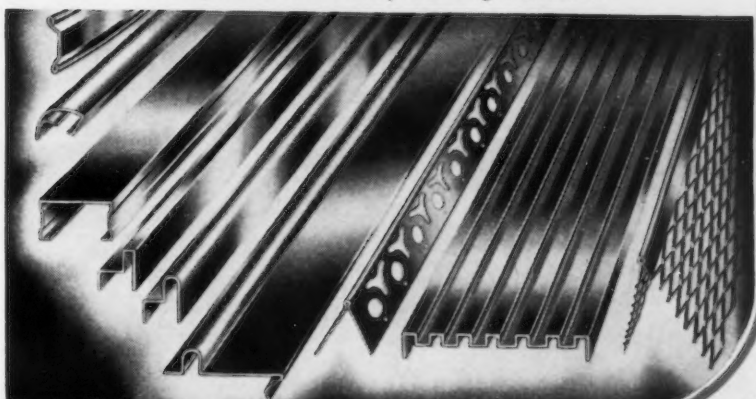
COLD ROLL FORMING MACHINES WILL MEET YOUR REQUIREMENTS

McKay special features and simplified engineering practices provide the following outstanding advantages:

1. All McKay machines have the patented "McKay McKrometer" adjustment, which saves hours of labor and permits precision adjustment of roll settings.
2. Standardized, interchangeable, removable guide and straightener brackets.
3. Single, two-speed and variable speed drives to meet production schedules.

McKay engineers have had many years' experience in solving difficult forming problems and—as a result, there is a McKay machine of proper size and type for every roll forming production problem.

Complicated sections, such as these, are now being made on McKay Forming Machines.



THE McKAY MACHINE CO.

Engineers and Manufacturers of
SHEET, TIN AND STRIP MILL EQUIPMENT
YOUNGSTOWN, OHIO

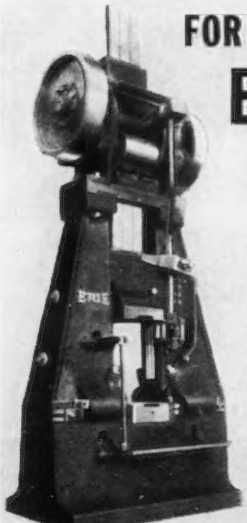
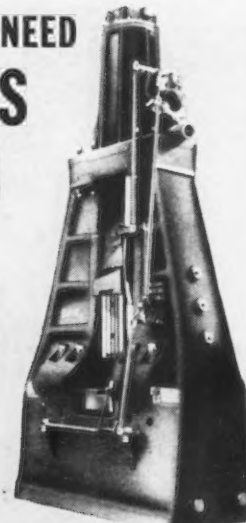
about 70 out of 2000 workers. Thompson Products, Inc., large aircraft parts maker, lost 79 out of 4500. A large downstate plant engaged wholly in peace time production with around 5000 workers, reports that it has not suffered.

According to George Case, chairman of Lamson & Sessions Co. here, and chairman of the

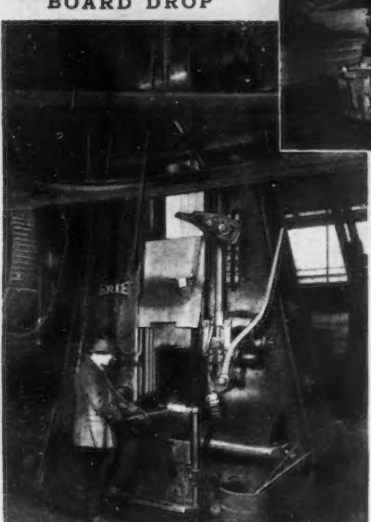
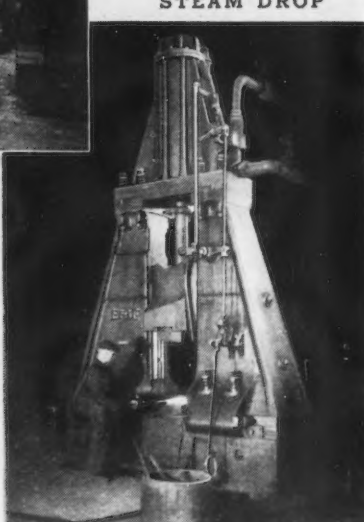
county board of draft appeals, mutual appreciation of each side's problems has been growing steadily between industrialists and draft boards.

In some of the smaller Ohio cities, the situation is a little more serious, particularly where the labor supply is limited and where at the same time draft quotas must be filled.

FOR EVERY DROP FORGING NEED
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BOARD DROP **STEAM DROP**

TRIMMING PRESSES



ERIE BUILDS Dependable HAMMERS

Erie Hammers and Presses are the choice of the world's leading drop forge shops. Steam Hammers up to 75,000 pounds. Board Drop Hammers up to 10,000 pounds for line shaft or self contained drives. Trimming Presses in a complete range of sizes. Write for your copy of Composite Catalog.

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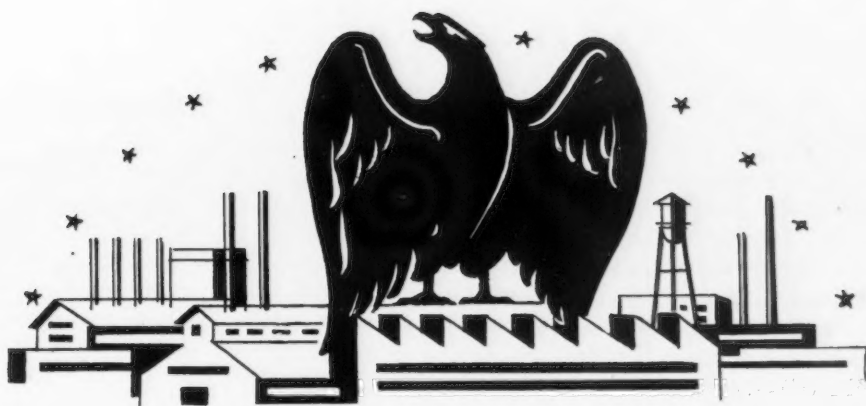
Photo by International

CARRYING AN OLD ARMY rifle, this 25-yr. old non-union employee of Birdsboro Steel Foundry & Machine Co. attempted to march through a strike picket line at the Birdsboro, Pa., plant gate. Police took him away.

The principal complaint of employers seems to be that getting in touch with a number of individual draft boards consumes far too much valuable time. At present there isn't any way that deferment claims can be filed with a central bureau.

At the same time, it is very necessary that the employer make a complete follow-through in cases vital to him. The advice and judgment of draft board clerks cannot always be depended upon. An intelligent and sincere claim for deferment must be made. The old saw about "the axle which squeaks loudest is the only one that gets greased" seems to be appropriate in draft cases affecting key men in industry.

Probably the most vigorous efforts to obtain deferment for all its employees have come from one of the large aircraft parts com-



DEFENSE

creates many plating problems

MANY manufacturers of metal products are today confronted with serious problems of obtaining raw material supplies and meeting the demands for finished articles.

Some manufacturers, for example, who have had no previous experience in chromium plating, now find it necessary to install plating facilities and get into large scale production without delay or costly experimenting. Others are faced with the problem of plating new or unfamiliar parts. Still others find it necessary to revamp their cycle of operation because priorities in certain materials have made it essential that new methods and processes be utilized.

These problems are only a few of the many that exist. What to do under the circumstances has proved to be a perplexing question for many companies — and yet the problems *must* be solved quickly and at a minimum expense.

To manufacturers confronted with such metal-plating problems, United Chromium believes it can be of real assistance. In serving hundreds of licensees, many in the defense industries, United Chromium has had wide experience in coping successfully with a great variety of plating problems — not only in the field of chromium plating but in practically every branch of the metal working industry.

Whether in the use of Chromium plating or in still newer fields, United Chromium's services make available engineering cooperation in the production of plating finishes that, in many instances, goes further than the mere application of a metal to the surface. The engineering staff of United Chromium, Incorporated, is prepared to offer its licensees:

1. Technical assistance in connection with their metal-plating problems.
2. Advice and suggestions including layouts, blueprints and estimated costs of equipment . . . particularly valuable to those companies who have had no previous experience with chromium plating or other U.C. finishes.
3. Information and advice which will assist in the speedy procurement of suitable plating equipment—as well as supervision and advisory counsel in enabling licensees to place their installations into prompt and efficient production.

May we suggest that as a preliminary step you write us briefly explaining the nature of your metal-finishing problem. We shall be glad to tell you frankly whether or not we think we can be of service. Simply address your inquiry to Department A, United Chromium Incorporated, 51 East 42nd Street, New York, N. Y.

*To meet today's
metal finishing problems*

UNITED CHROMIUM OFFERS

Chromium Plating

Electrocolor*

"Patternplate"

Unichrome* Copper Plating

Unichrome* Rack Coatings

Unichrome* Clear Lacquers

If you are interested in any of the U. C. finishes or products listed, we shall be glad to send further information.

*Trademark Reg. U. S. Patent Office

UNITED CHROMIUM, INCORPORATED

New York • Detroit • Waterbury

panies here. Over 200 letters have been written by the company and every case is followed up thoroughly. In a few cases letters have already been written by this company for prospective employees who are not yet out of college.

At Youngstown, deferments are not being requested at anywhere near the rate prevailing in Cleveland. One foreman in the metallurgical department of Youngs-

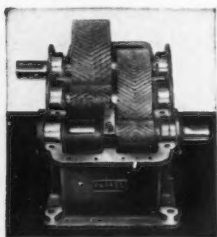
town Sheet & Tube Co. was among the recent departures, and there have been numerous other cases.

In the opinion of some industrial leaders in Ohio, conservation of industrial manpower through reducing accidents in plants is more important now than the draft. Menace of time losses through accidents is increasing due to the large numbers of new employees, it is said.



Group of twenty speed change reducing units

FARREL GEAR UNITS



Typical double reduction assembly. Intermediate bearings and shaft properly proportioned for loads transmitted. Note rigid mounting of high speed pinion



Catalog No. 438 is a handbook of valuable data for gear users, containing specifications, ratings and dimensions. Send for free copy.

Engineered to Specific Conditions of Speed, Load and Service

Farrel Gear Units provide smooth, quiet, uniform transmission of power, and give unfailing, efficient performance under the most exacting conditions.

A complete series of these units is available for a wide range of industrial applications. It includes single, double and triple reduction units, speed change units having two or more selective speeds, speed increasing units, right angle units, heavy duty drives and drives to meet special requirements.

All units are self-contained and totally enclosed—standardized in general design but with flexibility in detail which permits variation to suit specific conditions of speed, load and service.

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333 VULCAN STREET
BUFFALO, N. Y.
FARREL SYKES GEARS *The Gear with a Backbone*

Methods Listed For Saving Manganese

• • • A report offering the following suggestions for saving manganese (U. S. consumption now 500,000 tons yearly) has been given to Harold L. Ickes, Secretary of the Interior, by Dr. R. R. Sayers, Director of the U. S. Bureau of Mines.

1. "Economy in the use of manganese by making certain that the steel does not contain more manganese than necessary for the purpose for which it is used.

2. "Substitution of alloys containing less manganese for those containing more—for example, the substitution of spiegeleisen for ferro-manganese. Ores suitable for the former type of product are relatively more abundant in the United States.

3. "Substitution of other deoxidizing agents such as zirconium and titanium.

4. "Substitution of other agents for modifying properties such as nickel and chromium.

5. "Use of furnace procedures designed to yield a high-residual manganese metal at the end of the heat and thus make possible smaller additions of manganese alloy."

Subcommittee Appointed For New Steel Defense Group

• • • An executive subcommittee, including B. F. Fairless, U. S. Steel Corp. president, T. M. Girdler, chairman of Republic Steel Corp., E. G. Grace, president of Bethlehem Steel Co., E. L. Ryerson, chairman of Inland Steel Co. and E. T. Weir, chairman, of National Steel Corp. has been appointed for the recently-organized Iron and Steel Industry Defense Committee.

The Defense Committee, headed by Mr. Fairless, was formed by the steel industry at the request of OPM officials to help solve iron and steel problems arising from the defense program. Walter S. Tower, president of the American Iron and Steel Institute, will act as the committee's coordinator with the OPM.

Government Awards

Government awards, during the week ended April 12, 1941, as listed by the Public Contracts Division, Department of Labor, follow:

Iron and Steel Products...\$3,931,752

Allegheny Ludlum Steel Corp., Pittsburgh; strip steel	\$56,395
Alterfer Bros. Co., Peoria, Ill.; anti-tank mines	221,600
American Chain & Cable Co., Inc., American Cable Div., Bridgeport, Conn.; cable	50,936
American Scale Co., Kansas City; machinists vises	12,712
Armstrong Bros. Tool Co., Chicago; wrenches	15,735
Babcock & Wilcox Co., New York; steam boiler parts	23,348
Baldt Anchor, Chain & Forge Co., Chester, Pa.; anchor chain	48,137
Bay City Shovels, Inc., Bay City, Mich.; crawler type cranes	28,355
Barber Greene Co., Washington; truck loading machines	24,965
William J. Beer Co., Inc., New York; steel clasps for eye pieces	18,325
Berkley Mach. Works & Foundry Co., Inc., Norfolk, Va.; terminal tubes	50,344
Bethlehem Steel Co., Bethlehem, Pa.; steel	71,160
Bethlehem Steel Co., Seattle; steel bars	13,121
Bond Foundry & Mach Co., Manheim, Pa.; piece parts	18,539
California Steel Products Co., San Francisco; handrailing, metal	36,695
Caterpillar Tractor Co., Peoria, Ill.; diesel engines	18,709
Chapman Valve Mfg. Co., Indian Orchard, Mass.; valves	33,859
Chicago Pneumatic Tool Co., Philadelphia; portable pneumatic sump-pumps	19,930
Colson-Merriam Co., Washington; tray conveyors	10,914
Commercial Filters Corp., Boston; Fulflo and elements filters	13,375
Continental Can Co., New York; canister body assys.	62,550
Crane Co., Washington; composition pipe fittings	249,972
valves	22,600
Crescent Tool Co., Jamestown, N. Y.; pliers and wrenches	73,911
Crown Iron Works Co., Minneapolis; screw posts	13,275
Crown Can Co., Philadelphia; container assys.	129,750
Crucible Steel Co. of America, New York; seamless steel tubing	24,874
carbon drill rod steel	10,813
Darby Prod. of Steel Plate Corp., Kansas City, Kan.; gate position indicators	17,344
Dohrmann Hotel Supply Co., San Francisco; gasoline systems for refueling planes	107,000
Dravo Corp., Pittsburgh; steel bents	85,700
Electric Auto-Lite Co., Toledo, Ohio; piece parts	10,116
Empire Machinery & Supply Corp., Norfolk, Va.; dowels; nuts; screws	14,317
Erie Forge Co., Erie, Pa.; steel forgings	13,110
Fairbanks-Morse & Co., Cincinnati; railroad track scales	19,376
flood protection pumps	19,222
General Motors Corp., Cleveland Diesel Engine Division, Cleveland; diesel engine parts	11,259
M. Greenberg's Sons, San Francisco; valves	25,190
Hart Mfg. Co., Louisville, Ky.; coal burning stoves	20,907
Ingersoll Steel & Disc Div., Borg-Warner Corp., Chicago; coal burning furnaces	152,454

Jones & Laughlin Steel Corp., Pittsburgh; nails	18,020
steel cable	11,814
Laclede Steel Co., St. Louis; wire mesh	11,836
steel pipe	10,732
Charles E. Larson & Sons, Inc., Chicago; hooks, "S." 10-ton	11,132
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.; steel valves	19,060
Marine Works, Inc., New York; trays	12,000
Market Forge Co., Everett, Mass.; truck stands	38,370
McArdle & Cooney, Inc., Philadelphia; valves and fittings	30,799
Bruce McDonald Co., Kansas City; bake ovens	26,000
W. H. McMillan's Sons, New York; steel blocks	14,480
Mound Tool Co., St. Louis; packing tools	15,191
North American Iron & Steel Co., Inc., Brooklyn; booby hatches	14,432
Parker Appliance Co., Cleveland; couplings and fittings	12,183
Pittsburgh Steel Co., Pittsburgh; boiler tubes	56,359



Photo by Wide World

HOW BIG ARE BOMBS?: This 2000-lb. bomb was displayed recently at the new Army air base at MacDill Field, Tampa, Fla.

Pittsburgh Steel Co., Pittsburgh; tubes	27,855
Reid Avery Co., Baltimore; welding electrodes	26,590
Republic Steel Corp., Birmingham; wire and nails	25,505
Jos. T. Ryerson & Son, Inc., Jersey City; reinforcing round bars	12,650
Seamless Products Co., New York; oil cans	14,072
Standard Forgings Co., East Chicago, Ind.; shell forgings	561,600
Standard Motor Co., Shrewsbury, N. J.; valves	20,338
Steel & Tube Div., Republic Steel Corp., Cleveland; conduit pipe	77,307
Threadwell Construction Co., Midland, Pa.; dredge pipe	14,544
Truscon Steel Co., Seattle; prefabricated buildings	26,618
Washington Corrugated Culvert Co., Seattle; Nestable culvert	11,120
Wheeling Steel Corp., Wheeling; roofing and sheeting nails	30,596
Wisconsin Axle Div. of Timken-Detroit Axle Co., Oshkosh, Wis.; parts for light tanks	16,244
Youngstown Sheet & Tube Co., Youngstown, Ohio; corrugated roofing	67,959

Non-ferrous Metals & Alloys \$2,693,008

Aluminum Co. of America, Washington; aluminum	\$101,902
aluminum alloy, ingot	12,138
army upper caps	37,200
American Brass Co., Waterbury, Conn.; pipe and tubing	66,879
copper pipe, brass pipe	18,158
American Smelting & Refining Co., Seattle; pig lead	20,884
Argo Lamp Co., Philadelphia; floor lamps	13,859
Baker & Co., Inc., Newark, N. J.; platinum and platinum rhodium alloy	251,865
Bendix Aviation Corp., Bendix, N. J.; instrument lamp	15,840
Chase Brass & Copper Co., Inc., Waterbury, Conn.; brass, bronze, copper, rods, bars and sheets ..	23,231
brass	17,511
cartridge brass discs	1,062,432
Elgin National Watch Co., Elgin, Ill.; navigation watches	113,928
Doehler Die Casting Co., Pottstown, Pa.; aluminum castings; gas mask nozzles	139,861
International Nickel Co., Inc., New York; bars and tubing, nickel copper alloy plates	13,964
Madison-Kipp Corp., Madison, Wis.; die castings	15,780
Middlesex Supply Co., Lowell, Mass.; pig lead	12,950
Perkins Marine Lamp & Hardware Corp., Brooklyn; running and signal lights	14,250
Phelps Dodge Copper Products Corp., New York; seamless, drawn brass pipe	154,139
Pollak Mfg. Co., Arlington, N. J.; aluminum cartridge containers ..	376,890
Revere Copper & Brass, Inc., Rome, N. Y.; brass nozzles for canisters	63,750
Revere Copper & Brass, Inc., Baltimore Division, Baltimore; brass rods	12,333
cartridge brass case cups	109,872
Westinghouse Electric & Mfg. Co., Dayton, Ohio; floodlight lamp assemblies	23,386

Other Machinery\$2,729,585

American Chain & Cable Co., Inc., American Cable Division, Wilkes-Barre, Pa.; phosphor bronze wire rope	\$61,064
American Fork & Hoe Co., Cleveland; axes, mattocks, shovels ..	61,200

GOVERNMENT AWARDS

Baldt Anchor, Chain & Forge Co., Chester, Pa.; anchors	23,308
Belmet Products, Inc., Brooklyn; fuze tubes	10,698
Bliss & Laughlin, Inc., Buffalo; bar steel	19,544
Boston Woven Hose & Rubber Co., Boston; bodies for fuze	30,895
Caterpillar Tractor Co., Peoria, Ill.; motor graders	12,007
Cedar Rapids Engin. Co. of Del., Cedar Rapids, Iowa; grinders ..	43,998
Charles E. Crofoot Gear Corp., S. Boston; gears and pinions	10,219
Decatur Iron & Steel Co., Decatur, Ala.; steel cable racks and trays	13,500

Ex-Cell-O Corp., Detroit; diesel engine parts	22,344
Fate-Root-Heath Co., Plymouth Lo- comotive Works, Plymouth, Ohio; diesel locomotive	16,547
Fort Pitt Bridge Works, Pitts- burgh; structural steel	100,000
General Motors Corp., Delco Remy Div., Anderson, Ind.; diesel en- gine parts	15,515
G. A. Gray Co., Cincinnati; mill- ing machine	50,788
planing machine	25,789
Hanson-Whitney Machine Co., Hart- ford; gages	21,566

Hardie Tynes Mfg. Co., Birming- ham, Ala.; compressor parts and tools	18,085
R. L. Harris, Inc., Knoxville, Tenn.; caterpillar tractors	67,080
Hussman-Ligonier Co., St. Louis; ice-cooled refrigerators	13,824
Johnson & Johnson, New Bruns- wick, N. J.; canisters	125,942
Ingersoll-Rand Co., New York; hammers, drills	20,391
King-Knight Co., San Francisco; generator set	26,608
Leavitt Machine Co., Orange, Mass.; valve reseating outfits ..	47,190
Leslie Co., Lyndhurst, N. J.; steam whistles	39,924
Lidgerwood Mfg. Co., Elizabeth, N. J.; winches	73,229
Lincoln Park Tool & Gage Co., Lincoln Pk., Mich.; gages	20,819
Lindberg Engineering Co., Chi- cago; furnaces	12,221
Link-Belt Co., Indianapolis; shell, H. E., machining	155,000
Maine Steel, Inc., So. Portland, Me.; bitts and chucks	39,462
Mall Tool Co., Chicago; electric drills	39,375
Moore Products Co., Philadelphia; brass housings	32,065
National Acme Co., Cleveland; ma- chines and equip.	26,630
National Cast Iron Pipe Division, James B. Clow & Sons, Birming- ham, Ala.; cast iron pipe	18,275
National Marking Machine Co., Cin- cinnati; laundry marking ma- chines	62,640
National Supply Co., Toledo; cyl- inder recuperator	13,081
Nordberg Mfg. Co., Milwaukee; diesel engine parts	22,721
Northwest Engin. Co., c/o Osborne Equip. Co., Reps., Knoxville, Tenn.; crawler type shovel	23,807
Peck Stow & Wilcox Co., South- ington, Conn.; sheet metal ma- chine	157,584
Peerless Bread Machine Corp., Sid- ney, Ohio; dough mixers	19,725
Phillips Petroleum Co., Philgas Division, Detroit; propane stor- age system	16,330
Republic Steel Corp., Cleveland; rivet steel	52,260
bar steel	19,544
Sandy Hill Iron & Brass Works, Hudson Falls, N. Y.; winches ..	188,032
Seovill Mfg. Co., Waterbury, Conn.; fuze plunger heads	52,980
Silent Hoist Winch & Crane Co., Brooklyn; wheel tractor type cranes	21,198
Singer Sewing Machine Co., New York; sewing machines	29,613
Smith, Drum & Co., Philadelphia; laundry tumblers, ironers	106,016
Sperry Gyroscope Co., Inc., Brook- lyn; tool kits	23,308
Sullivan Machinery Co., Knoxville, Tenn.; air compressor	22,195
Swind Machinery Co., Philadelphia; lathes	36,358
Taft Peirce Mfg. Co., Woonsocket, R. I.; thread gages	17,367
Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.; bitumi- nous coated metal pipe	17,851
U. S. Pipe & Foundry Co., Phila- delphia; cast iron pipe	84,785
U. S. Machine Corp., Lebanon, Ind.; shell, H. E., forging and machining	625,000
U. S. Steel Export Co., Washing- ton; beams and grillages	104,876
S. Weinstein Supply Co., New York; swivel assemblies, hinger and hasps	29,996
water cooler	17,199
Welin Davit & Boat Corp., Perth Amboy, N. J.; elec. winches ..	14,364
Winchester Repeating Arms Co., New Haven, Conn.; primers ...	35,805

TRADE **AUTOMATIC** MARK

Manufacturers for Over Thirty Years

MODERN *Electric Propelled* **INDUSTRIAL TRUCKS** FOR ECONOMICAL MATERIALS HANDLING

- FORK AND RAM TRUCKS
- LOW AND HIGH LIFT TRUCKS
- COIL AND SHEET HANDLERS
- LOAD CARRIERS
- TRACTORS — CRANES

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Fork and Ram Trucks
Telescopic and Non-Telescopic for
Pallet and Coil Handling



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Skid
Platform
Type

Cranes — Motorized Slewing
Type—Four Motor Control for
Individual and Simultaneous
Operation



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with motorized die
and unloading
platform



Light Duty Fork Trucks

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CHICAGO, ILL.

UNUSUAL ECONOMIES in Production of Certain Forgings Are Attainable on **AJAX** Solid Frame Forging Presses ...

"PRESS FORGING, when judiciously utilized and in keeping with the economics of a given part, produces forgings of excellent quality and, what is most important—at a lower cost."

One user of Ajax Solid Frame Forging Presses is press forging connecting rod caps, six to the billet, in two strokes of the press, in a die with three tandem impressions, producing three forgings to the stroke. The same manufacturer is also press forging two steering knuckles, a right and left simultaneously, from a single pre-formed billet, in three strokes on a new 2,000 ton Ajax Solid Frame Forging Press. Equally impressive results in the production of a wide variety of other parts may now be obtained by converting them into press forgings.

The advanced design of Ajax Solid Frame Forging Presses has greatly extended the variety of parts that can be economically produced as press forgings, and has also removed many of the restrictions imposed upon production by the older, slower, less rigid and less accurate crank, toggle, and hydraulic presses. Operating up to twice the speed of the fastest presses of equal tonnage ten years ago, these presses are enabling production executives to realize unforeseen production advantages and economies on parts that can be converted into press forgings.

Write for Bulletin 75 which fully describes Ajax Solid Frame Forging Presses and their production possibilities.



**BUY FORGING EQUIPMENT ON THE
BASIS OF MECHANICAL SOUNDNESS**

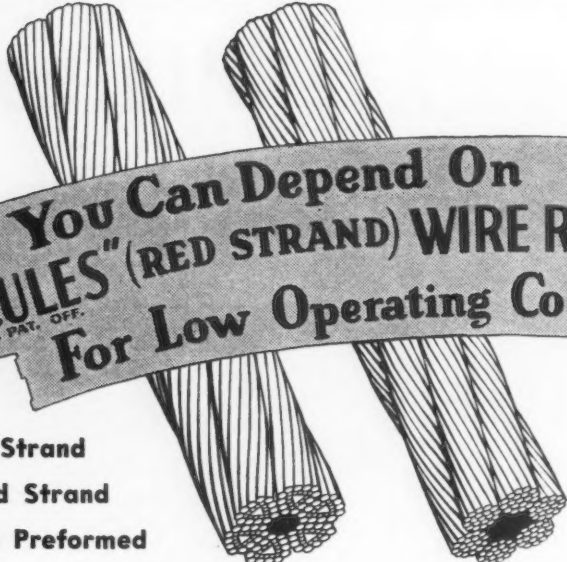
THE **AJAX**

MANUFACTURING COMPANY

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EUCLID BRANCH P.O.
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**You Can Depend On
"HERCULES" (RED STRAND) WIRE ROPE
For Low Operating Cost**

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Round Strand
Flattened Strand
Standard & Preformed

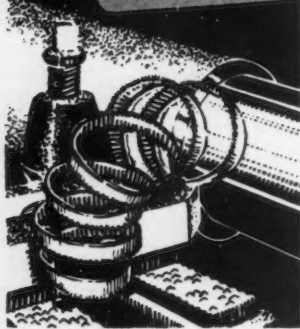
WHY not let "HERCULES" (Red-Strand) Wire Rope help you meet present day production requirements and still maintain a reasonable margin of profit? You will quickly discover that "HERCULES" is a dependable ally—not only in today's fight against increasing operating costs—but also in your endeavor to speed up production.

Made Only By **A. LESCHEN & SONS ROPE CO.** Established 1857

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New York • Chicago • Denver • San Francisco • Seattle • Portland

ON HEAVY "HOGGING" CUTS
save time with
Jessop PURPLE LABEL High Speed Steel



If you must remove a large amount of metal in minimum time — Jessop PURPLE LABEL is the answer to your problem. Due to its high red hardness, this superior cobalt type high speed steel will take fast cuts on the most abrasive materials without softening — and is particularly useful for "dirty work" where scale, sand holes, "nigger heads," and rough spots are encountered.

PURPLE LABEL is a cobalt high speed steel especially recommended for heavy duty work on hard, tough metals—such as hogging chilled cast iron, manganese steel castings, heat treated alloy steels, brass and other non-ferrous alloys. It is also used for finishing cuts at very high speeds. On jobs where performance is the first consideration—specify Jessop PURPLE LABEL High Speed Steel.

JESSOP STEEL CO., 537 Green St., Washington, Pa.



1901 CELEBRATING OUR 40TH ANNIVERSARY 1941

Jessop Steels of America

CARBON • HIGH SPEED • SPECIAL ALLOY •
STAINLESS • and COMPOSITE STEELS

India Will Seek To Get Steel From U. S.

London

• • • Due to the enormous demand for war purposes in the United Kingdom, the Indian Government has been informed by the British Government that fresh orders from India for most classes of steel previously supplied under "quota recommendation certificates" can not be accepted. Orders placed before this announcement was made are being executed so far as circumstances permit, but the Government of India has been asked to cease issuing quota certificates for all classes of steel except forgings (including wheels, tires, axles, and buffers), iron and brass wood-screws, grindery, baling hoops for the cotton trade, and special steels of a type which Britain alone can supply.

Indian orders for other classes of steel must henceforth be placed in the United States and the British Government has offered to permit such orders from India to be executed against contracts with the American steel industry on behalf of the British Supply Ministry.

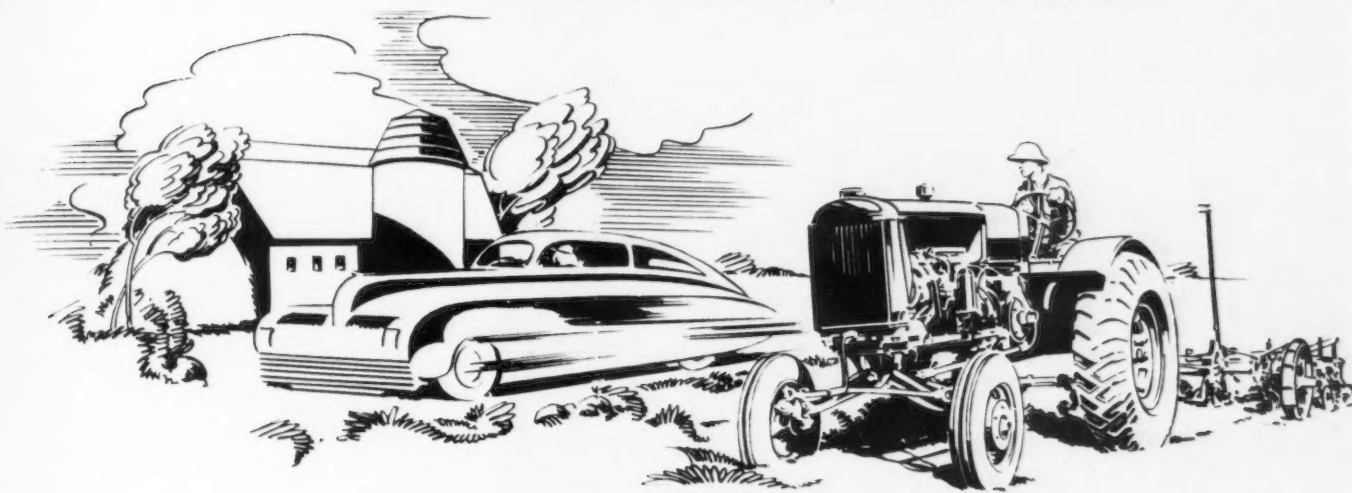
Wire Rope Corp. of America, Inc., New Haven, Conn.; steel wire rope	235,308
Wisconsin Axle Division, Timken Detroit Axle Co., Oshkosh, Wis.; transmission parts	207,880
Wright Aeronautical Corp., Paterson, N. J.; tank parts	27,941

Navy Dept., Bureau of Supplies and Accounts:

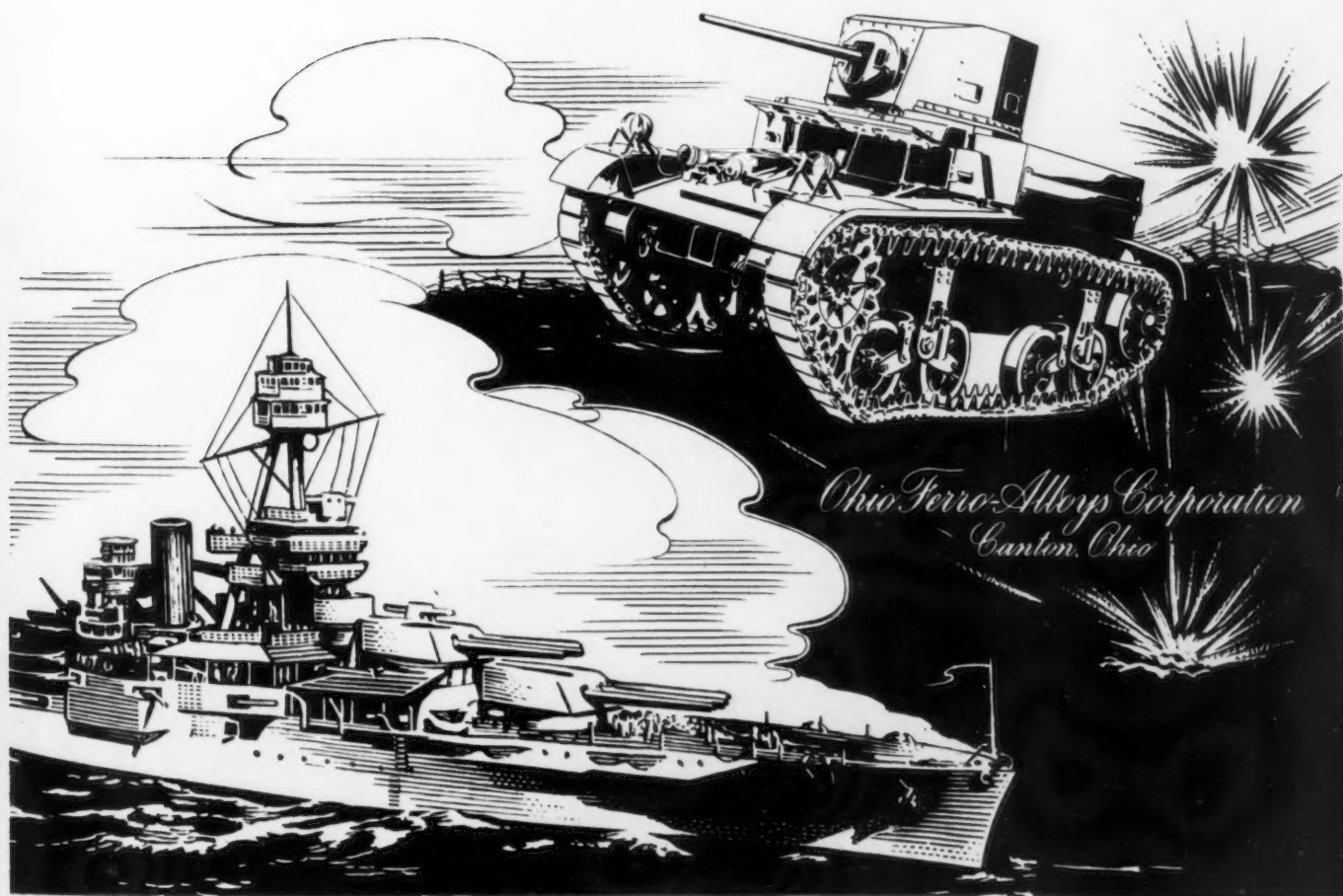
Aldrich Pump Co., Allentown, Pa.; pump, centrifugal, motor driven, spare parts, tools and wrenches	\$53,772
Alemite Co. of Maryland, Baltimore; guns, lubricating, pressure	6,667
Aluminum Co. of America, Washington; aluminum, ingot, special	18,500
American Brass Co., Waterbury, Conn.; tubing, copper-nickel alloy	112,427
disks, brass	287,625
Anaconda Wire & Cable Co., New York; cable, armored	278,700
Baker-Raulang Co., Cleveland; skids, bomb	25,667
Bertsch & Co., Inc., Cambridge City, Ind.; roll, straightening ..	6,985
Brown & Sharpe Mfg. Co., Providence; machines, milling	12,516
Carlton Machine Tool Co., Cincinnati; machines, Carlton radial drilling	570,410
Chapman Valve Mfg. Co., Indian Orchard, Mass.; valves, bronze, gate	107,159
Cincinnati Bickford Tool Co., Cincinnati; machines, drilling	778,342
Collyer Insulated Wire Co., Pawtucket, R. I.; cable, armored ..	40,260
Consolidated Machine Tool Corp., Rochester, N. Y.; mills, heavy duty	2,249,970
Cooper-Bessemer Corp., Mount Vernon, Ohio; propelling machinery for 14 minesweepers, AM82-99 class	3,766,000
Cramp Shipbuilding Co., Philadelphia; floating workshops	960,000



WE MUCH PREFER THAT OUR FERRO-SILICON, FERRO-CHROME, FERRO-MANGANESE, SILICO-MANGANESE AND SIMANAL BE USED IN THE PRODUCTION OF MATERIALS FOR THE PEACEFUL PURSUITS.



WITH THE PRESENT WORLD-WIDE TURMOIL AND STRIFE, A NECESSARY PORTION OF OUR PRODUCTION OF FERRO-ALLOYS MUST BE USED FOR MATÉRIEL FOR PREPAREDNESS PURPOSES.



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from
Holly

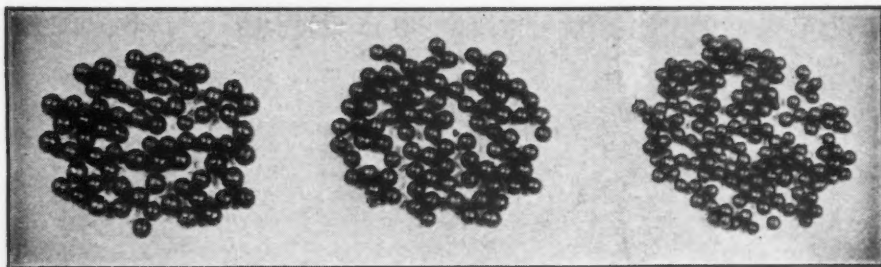
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We make springs from every type of wire up to and including three-eighths diameter. We pledge rigid adherence to your specification. Get our quotation on your next job.

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AND MANUFACTURING CORP.
Holly, Michigan



HEAT-TREATED STEEL SHOT

We manufacture shot and grit for endurance

A shot or grit that will blast fast with a clean finish.

This is the only reason why so many operators are daily changing to our shot and grit, from Maine to California.

The unprecedented demand for our—

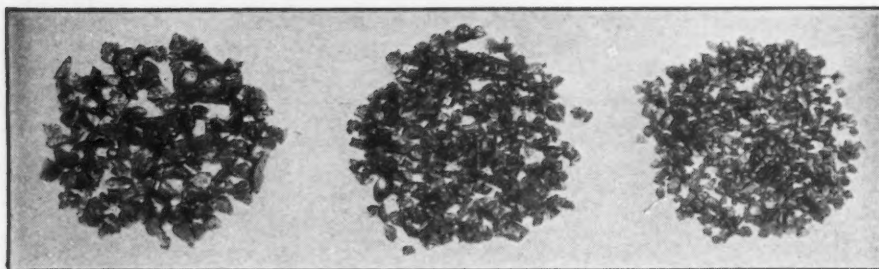
Heat-Treated Steel Shot and Heat-Treated Steel Grit

has enabled us to expand our production and maintain a quality that is more than satisfactory to our hundreds of customers all over the country.

HARRISON ABRASIVE CORPORATION

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HEAT-TREATED STEEL GRIT



GOVERNMENT

Crane Co., Washington; cocks and valves	658,369
Diamond T Motor Car Co., Washington; trucks, motor	15,283
General Cable Corp., Washington; cable, armored	1,241,400
General Electric Co., Schenectady; cable, armored	187,500
General Motors Corp., Cleveland Diesel Engine Div., Washington; parts for engine	29,627
Gisholt Machine Co., Madison, Wis.; lathe, turret	5,888
Heald Machine Co., Worcester, Mass.; grinder, internal, motor-driven, including equipment	9,130
Hexacon Electric Co., Roselle Park, N. J.; irons, soldering, electric	15,524
Kitson Co., Philadelphia; cocks, steam and water, and oil barrel	8,824
Lodge & Shipley Machine Tool Co., Cincinnati; lathes, precision, tool-makers, geared head	9,688
Lynd-Farquhar Co., Boston; machines, milling	17,409
Maine Steel, Inc., South Portland, Maine; shackles	35,435
Millers Falls Co., Greenfield, Mass.; drills, breast, plain and hand, hollow-handle	39,820
Mine Safety Appliances Co., Pittsburgh; containers, stainless steel	13,180
Montgomery & Co., Inc., New York; drills, ratchet	5,828
National Electric Products Corp., Pittsburgh; cable, armored	393,550
Okonite Co., Passaic, N. J.; cable, armored	196,750
Palmer Scott & Co., Inc., New Bedford, Mass.; launches, motor	61,089
Phelps Dodge Copper Products Corp., Habirshaw Cable & Wire Div., New York; cable, armored	880,750
Pittsburgh Valve & Fittings Corp., Barberton, Ohio; valves, bronze	106,257
Pratt & Whitney Div., Niles-Bement-Pond Co., W. Hartford; borer, jig, precision	13,414
Remington Arms Co., Inc., Bridgeport, Conn.; primers, case percussion	40,854
Revere Copper & Brass, Inc., Baltimore Div., Baltimore; tubes	



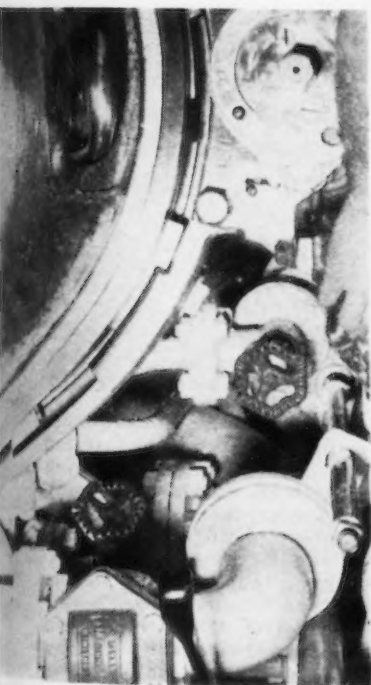
TORPEDOMAN on a

AWARDS

condenser, copper, nickel-alloy...	69,779
brass, naval, rolled, bar	109,317
Rockford Brass Works, Washing- ton; faucets, bronze, compres- sion, hose-bibb	6,978
Stanley Tools Div.; braces, ratchet, and drills, breast, plain	18,017
Vickers, Inc., Waterbury Tool Div., Waterbury, Conn.; spare parts for motors and pumps	686,634
Westinghouse Elec. & Mfg. Co., East Pittsburgh; sets, welding, are	108,260
Yellow Truck & Coach Mfg. Co., General Motors Truck & Coach Div., Pontiac, Mich.; trucks, mo- tor	11,675

War Dept., Ordnance:

Allegheny Ludlum Steel Corp., West Leechburg, Pa.; steel, strip	\$56,395
Allis-Chalmers Mfg. Co., Milwau- kee; brake controls	5,287
American Locomotive Co., New York; casting machine parts ..	12,394
American Manganese Bronze Co., Philadelphia; bronze, manganese	5,501
Baker & Co., Inc., Newark; plati- num	251,865
Fred K. Blanchard, Inc., Troy, N. Y.; wheels, grinding	5,789
Chase Brass & Copper Co., Inc., Waterbury, Conn.; brass discs...	1,062,432
Continental Motors Corp., Detroit; parts, light tanks	6,789
Diamond T Motor Car Co., Chi- cago; parts	18,098
Fox Munitions, Philadelphia; gages	10,186
Gilmore Wire Rope Co., Muncy, Pa.; cables, steel	11,814
Gould & Eberhardt, Irvington, N. J.; shapers	5,136
Charles E. Larson & Sons, Inc., Chicago; hooks	11,132
Latrobe Electric Steel Co., La- trobe, Pa.; steel	8,604
Lindberg Engineering Co., Chicago; equipment, furnace	58,500
Magnus Tool & Die Co., Newark; punches, guides, bases and an- vils	77,773



United States submarine.

First AGAIN WITH **NEW** and **IMPROVED** **Blast CLEANING EQUIPMENT**

For Cleaning-

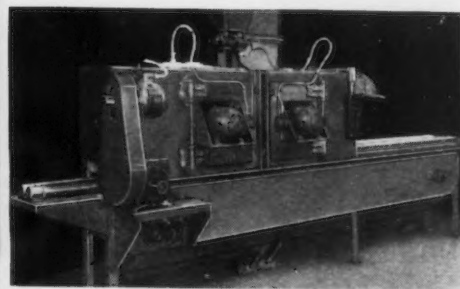
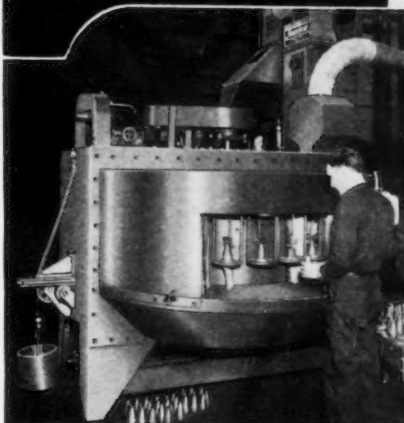
**SHELLS
BOMBS
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ARMAMENT MATERIALS**

*Another
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to Speed America's
NATIONAL DEFENSE*

American blast cleaning equipment is the first line of defense wherever munitions, armament, guns, aircraft and other defense materials are being produced because:

- It slashes cleaning costs; ● Steps up production; ● Reduces operating and maintenance costs; ● Conserves power and valuable space; ● Stands the gaff of severe operating conditions. That's why the great majority of plants handling defense work are buying American.

Get all the facts about this modern blast cleaning equipment today. There is no obligation, of course.



Above: WHEELABRATOR Special Cabinet for cleaning gun barrels. At Left: Auto Specialties Mfg. Co., St. Joseph, Mich., uses this American Blast Cabinet for cleaning trench mortar shells.



THE AMERICAN MOLDER
TRADE MARK

AMERICAN
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WHEELABRATOR
AIRLESS ABRASIVE BLASTING EQUIPMENT

GOVERNMENT AWARDS

Mesta Machine Co., Pittsburgh; sleeves	8,950
Norton Co., Worcester; machines, grinding	36,988
Reliable Tool Co., Irvington, N. J.; punches, etc.	103,950
Revere Copper & Brass, Inc., Rome, N. Y.; time train rings.	307,500
Seovill Mfg. Co., Waterbury, Conn.; brass strip	47,160

Sears Saddlery Co., Davenport, Iowa; assemblies, range finder.	8,061
F. J. Stokes Machine Co., Philadelphia; presses	54,340
Timken-Detroit Axle Co., Wisconsin Axle Div., Oshkosh, Wis.; parts	16,244
Vinco Tool Co., Detroit; gages ...	5,452
Welson Tool Co., Cleveland; cutters	5,050

Western Cartridge Co., Winchester Repeating Arms Co. Div., New Haven, Conn.; cartridges	7,950
War Dept., Other Agencies:	
Albert & Davidson Pipe Corp., Brackenridge, Pa.; pipe	\$7,719
Bendix Aviation Corp., Eclipse Aviation Div., Bendix, N. J.; assemblies	221,064



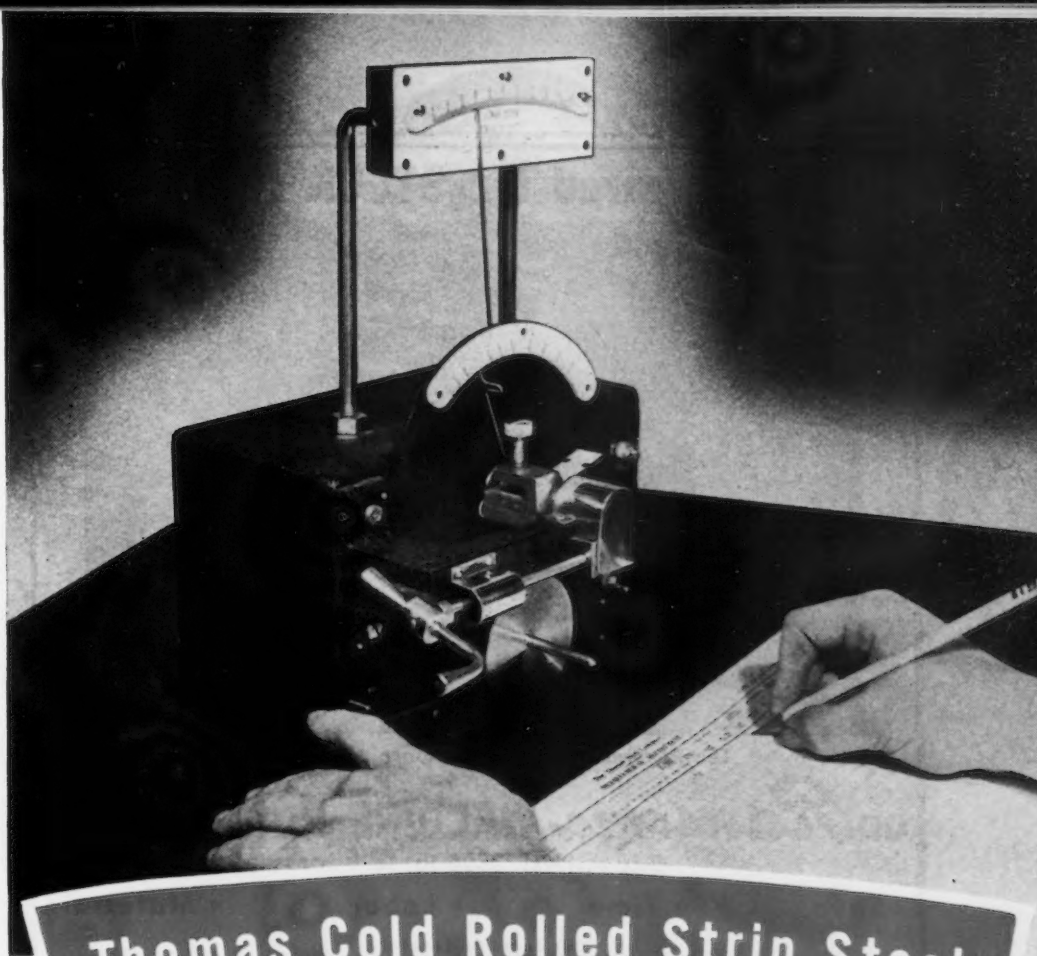
PEACE PROJECT: Spectacular phases of national defense construction have obscured the fact that large undertakings having no relation to war are still going on. One of these is the Delaware aqueduct, which when completed will bring 700,000,000 gal. of water daily from the Catskill Mountains to New York City. One of the most difficult parts of this construction job, the laying of a tunnel under the Hudson River, is approaching completion. The contract for this section was undertaken by Pleasantville Constructors, Inc., Chelsea, N. Y., and calls for the driving and lining of 36,600 lin. ft. of tunnel that will have a finished diameter of 13½ ft. This section

passes under the Hudson 600 ft. below the surface of the water and has a minimum covering of 300 ft. of bedrock in addition to the overlying river bed. The Hudson is 3400 ft. wide at this point. This photograph of this subterranean tunnel was made by Paul H. Bird, amateur photographer who is employed as geologist by the Board of Water Supply of New York. Through a part of the section the contractor encountered water bearing rock which required the placing of about 1300 ft. of lining consisting of 750 tons of square twisted reinforcing bars and a cylindrical plate lining 1 in. thick totaling about 2000 tons.

Bendix Aviation Corp., Pioneer Instrument Div., Bendix, N. J.; maintenance parts for instruments	112,054
indicators and transmitters	370,416
S. Blickman, Inc., Weehawken, N. J.; chart racks	18,678
Buda Co., Harvey, Ill.; augers, earth	89,896
Chicago Pneumatic Tool Co., Cleveland; pneumatic sump pumps ..	19,930
Cincinnati Lathe & Tool Co., Oakley, Cincinnati; engine lathes ..	8,202
Cleveland Pneumatic Tool Co., Cleveland; pneumatic tampers ..	9,000
Cleveland Trencher Co., Cleveland; trench digger	5,475
County Supply Co., Greenfield, Mass.; drills	14,512
Crosley Corp., Cincinnati; bolts and brackets	78,204
Electric Auto-Lite Co., LaCrosse, Wis.; gage assemblies	123,807
Equitable Equipment Co., Inc., New Orleans; armor plating ..	8,458
Ford Motor Co., Dearborn, Mich.; educational order for airframes ..	3,418,500
General Motors Corp., Delco Products Div., Dayton, Ohio; strut assemblies	992,389
C. H. Gosiger Machinery Co., Dayton, Ohio; drill presses	53,116
Goodyear Tire & Rubber Co., Inc., Akron, Ohio; brake assemblies ..	113,173
Harris Seybold Potter Co., Cleveland; presses	80,600
Independent Pneumatic Tool Co., Aurora, Ill.; pneumatic drills ..	22,110
pneumatic tools	14,067
Ingersoll-Rand Co., Athens, Pa.; pneumatic circular saws	15,427
grinders and vibrators	33,703
air compressors	84,660
Wm. Langhein & Brothers, Brooklyn; surgical instruments	14,858
Lanston Monotype Machine Co., Philadelphia; precision cameras ..	19,668
Lindberg Engineering Co., Chicago; furnaces, heat treating ..	58,470
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.; gage assemblies	50,071
Glenn L. Martin Co., Baltimore; aircraft plant and plant additions ..	24,275,053
Melli-Blumberg Corp., New Holstein, Wis.; trailers	27,920
D. W. Onan & Sons, Minneapolis; portable generators	38,884
Oneida, Ltd., Sherrill, N. Y.; forceps	30,165
Paving Supply & Equipment Co., Mansfield, Ohio; rail driving machines	8,977
Sperry Gyroscope Co., Brooklyn; indicator and controller assys. ..	1,999,265
automatic pilots	635,160
scales	15,616
Standard Steel Works, North Kansas City; trailers and dollies ..	624,332
Weston Electric Instrument Corp., Newark; assemblies, bulbs	214,341
Wright Aeronautical Corp., Paterson, N. J.; parts for engines ..	785,660

Summerill Contestants May Seek Lincoln Prizes

• • • Papers entered in the Summerill Tubing Co.'s contest to advance the art of welding aircraft steels will be eligible in the \$200,000 industrial progress award program being sponsored by the James F. Lincoln Arc Welding Foundation, the Lincoln Company announces.



Thomas Cold Rolled Strip Steel Focused on YOUR Forming Requirements

ACCURATE and sensitive machines in the Thomas laboratory duplicate as closely as possible your forming requirements. The data which is collected and accumulated enables us to govern production through the mill and produce Thomastrip with proper characteristics. On light gauges, for instance, the resistance to deformation is checked and spring-back from that deformation—an important step BEYOND the indentation processes of checking. This is one example of thorough investigation which exists throughout the Thomas plant, facilitating the production of Thomastrip to meet your specifications not only once but time after time.

Thomas Strip

Always Laboratory Approved

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UNCOATED AND
ELECTRO COATED
WITH NICKEL,
ZINC, COPPER, BRASS**

THE THOMAS STEEL CO.
SPECIALIZED PRODUCERS OF COLD ROLLED STRIP STEEL
WARREN, OHIO

We're prepared for STOCK SHIPMENT



The Ransome Welding Positioner Assembly Line

on *Ransome* WELDING POSITIONERS

Capacities: 2500 lb. to 8 tons

Save

• Time

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• Material

**Write for Literature
Industrial Division**

RANSOME CONCRETE MACHINERY COMPANY

Dunellen, N. J.



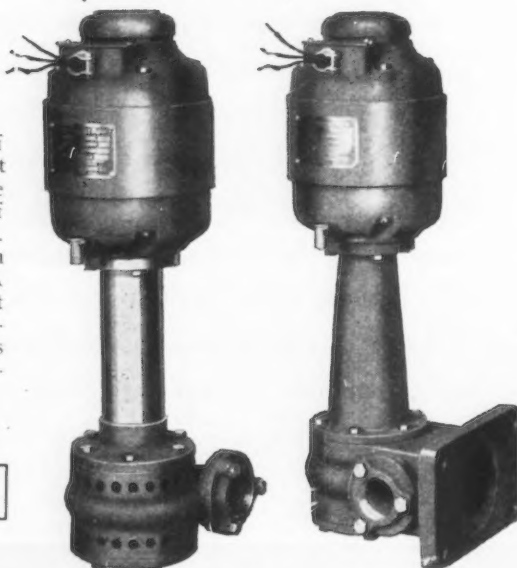
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Look
Any Farther*

**GUSHER COOLANT
PUMP**

If you want a coolant pump of high efficiency, correctly priced, don't look any farther. Here it is—the Gusher preferred by thousands of users over all other coolant pumps.

The Gusher starts delivery when you flip the switch—no priming. A small trickle or a big flow to suit your needs. Maintenance is something you can forget because this pump has no packing, and grit particles cannot harm it.

The
RUTHMAN
Machinery Company
CINCINNATI, OHIO, U.S.A.



"Ore To Steel For Britain" In 10 Days

Warren, Ohio

• • • The first vessel shipment of Lake Superior iron ore to arrive this season was quickly converted into finished steel by the Warren plant of Republic Steel Corp.

Total elapsed time from the Tobin mine in Northern Michigan to completed hot strip, ready for shipment for British defense orders, was ten days. Of this, nearly eight days were consumed by transportation from the mine to Warren.

The ore started to leave the Tobin Mine, recently reopened after being closed for several years, on April 1, and shipment to Escanaba was completed by April 4.

The Steamship *Marquette*, which had fought its way through 20 in. of ice with the aid of the coast-guard cutter *Tahoma*, arrived in Escanaba and completed loading on April 4, sailing on the morning of April 5, aided by her sister ship, the *Joliet*. The ore arrived at the C. & P. docks in Cleveland on the morning of April 9 and left by train for Warren on the same day. It arrived in Warren, was unloaded and charged into the blast furnace on April 10, and the first metal made from the ore was tapped at 6:00 a.m. April 11.

At 9:20 a.m. on April 11 work began on charging heat No. 36604 in the open hearth. By noon, 100 tons of scrap had been charged and started to melt and 128 tons of the Tobin molten iron was charged by 6:00 p.m.

The heat was tapped at midnight and pouring of the steel into ingots completed at 1:15 a.m., April 12. The ingots were charged in the soaking pits 45 min. later and two hours after that, or 4:00 a.m., heat No. 36604 was being rolled into 6½ in. by 2½ in. by 29 ft. flats which were taken immediately to the strip mill and rolled into 6⅞ in. by 0.061 in. hot strip. After cooling, the hot strip was ready for immediate shipment to fill defense orders.

Warren also converted the ore brought down by the Steamship *Hennepin*, the first boat to enter Lake Superior through the Soo Locks in 1941. This steamer was

Reich Doubles Steel Deliveries To Italy

London

••• The new German-Italian trade agreement, just signed, provides that all coal consumed in Italy is to be supplied by Germany. The iron and steel deliveries from Germany are to be more than doubled, while the export of mercury from Italy is to be increased.

Another 205,000 Italians, mainly metal workers, are to go to Germany, thus increasing the number of Italian workers in the Reich to 350,000. It is probably the German intention to make Italy dependent on the Reich for her ferrous metal supplies and the migration of the former's metal workers will no doubt lead to a severe curtailment in Mussolini's plans for the development of the iron and steel industry in Italy.

locked through into Lake Superior at 1:00 p.m., April 3, and the ore arrived in Warren on April 11 and was immediately charged into the blast furnace for conversion into steel in the open hearths.

11 Strikes Turned Over To New Mediation Board

••• Here is the status of the strike cases so far certified to the National Defense Mediation Board by the Department of Labor:

(1) Cyclops Steel Co., Bridgeville, Pa. Dispute settled March 28. Case closed.

(2) Vanadium Corp. of America. Agreement to resume operation, reached March 30. Board investigation pending.

(3) Condenser Corp., South Plainfield, N. J. Dispute settled April 2. Case closed.

(4) International Harvester Co.—two plants in Chicago, Illinois, and one each in Rock Falls, Ill., and Richmond, Ind. Production resumed March 31 and agreement reached after meetings with the board April 2. Board investigation pending.

(5) Snoqualmie Falls Lumber Co., Snoqualmie Falls, Wash. Meetings with the board began April 9. Pending.

(6) Allis-Chalmers Mfg. Co., West Allis, Wis. Strike settled April 7. Lloyd C. Garrison, Dean, Law School, University of Wisconsin, was appointed arbitrator by the Mediation Board on April 11, in accordance with the terms of the agreement settling the strike. Case closed.

(7) Seas Shipping Co., New York. Strike settled April 11. Case closed.

(8) Standard Tool Co., Cleveland, Ohio. Meetings with the board began April 10. Agreement reached April 12.

(9) Cowles Tool Co., Cleveland. Meetings began with the board April 11. Pending.

(10) Phelps Dodge Copper Products Corp., Bayway, N. J. Meetings with the board began April 10 and adjourned the same day. Meetings were resumed April 14.

(11) J. Sklar Mfg. Co., Long Island City, N. Y. Meetings with the board scheduled to begin April 14.

Farm Implement Exports Climb 21%

Washington

••• February exports of farm implements and machinery, valued at \$5,418,683, represented an increase of 21 per cent over the February, 1939 figure, the Machinery Division, Department of Commerce, reports. The increase was attrib-

uted to a 32 per cent gain in exports of tractors and parts.

Exports of tillage implements were down 28 per cent while exports of tractors, parts and accessories increased 32 per cent to \$4,054,805. Consignments of wheel tractors were valued at \$1,261,443 in February compared with \$913,983 in the same month of last year. Harvesting machinery exports increased 37 per cent.

Any difference

in the price of forgings, as between two or more sources of supply, may result in a wider spread in final costs at the point of assembly, with the forgings that were lowest in price at the point of delivery being highest in cost at the point of assembly. Ask a T & W Forging Engineer how this can happen. He has supporting evidence for you.



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**USUALLY COST LESS
AT THE POINT OF
ASSEMBLY**

TRANSUE & WILLIAMS
STEEL FORGING CORPORATION
ALLIANCE, OHIO

Sales Offices: New York, Philadelphia, Chicago, Indianapolis, Detroit and Cleveland

Westinghouse Forum Told of New Machine Tool Wiring Standard

• • • More than 110 delegates, representing over 70 leading builders of machine tools, attended the 16th annual Machine Tool Electrification Forum held at East Pittsburgh, April 14-16, under sponsorship of the Westinghouse Electric & Mfg. Co. Despite pressing demands of the defense emergency, attendance at the 1941 meeting reached an all-time high, emphasizing the continually growing success of the annual event in helping solve common design and production problems of the machine tool and the electrical industries.

Highlight of this year's forum program was a confidential talk on machine tool procurement and production problems of national defense, delivered by Howard Dunbar, former vice-president and general manager of the Norton Co. and at present technical chief of the OPM in Washington. The delegates, including executives, engineers, and designers, discussed mutual problems at a series of round-table conferences and listened to technical papers presented by engineers from both the machine tool companies and Westinghouse.

Delegates were welcomed at the opening session by L. F. A. Mitchell, manager of Westinghouse's machinery electrification section. He introduced R. S. Kersh of the same section, who presided as chairman throughout the three-day meeting. Tell Berna, general manager of the National Machine Tool Builders Association, told the group of the importance of every individual's contribution of his full energy toward machine tool production.

R. H. Clark, electrical engineer of the Warner & Swasey Co., started the paper presentations with his discussion of "Standardization of Electric Apparatus Installation." Mr. Clark first described how his company had simplified the mounting of starter boxes and push button controls on its line of turret lathes and then reviewed the possibility of electrical manu-



100 FIGHTING SHIPS AND 30 cargo vessels and tankers will be driven by propulsion equipment being made at Westinghouse Electric & Mfg. Co.'s Steam Division plant at Lester, Pa. Shown here are Assistant Secretary of the Navy Ralph A. Bard, left, R. A. McCarty, in dark suit, Westinghouse vice-president, and third from left, G. P. Passmore, manager of manufacturing. Navy officials and industrialists inspected the plant and saw its new 300 x 100 ft. drafting room, said to be the longest unobstructed room of its kind. The new office building at Lester has continuous strip fluorescent lighting, electrostatic air cleaning, air cooling by steam jet refrigeration, soundproof floors and ceilings. Some 3600 continuous strip fluorescent fixtures, totaling more than 3 miles, consume approximately 200 kw. at an average efficiency of 1.4 watts per sq. ft. More than 400 machine tools are being installed in the Lester plant's shop.

facturers standardizing some of the important mounting dimensions of the basic starters and devices in the control line. He urged that the location and size of

mounting holes in cabinets be standardized as soon as possible and that overall cabinet dimensions be standardized within the next five years.

It was brought out that a committee of the National Machine Tool Builders Association has just mailed to members a preliminary draft covering standard methods of wiring machine tools. If adopted by the industry, maintenance of the electrical equipment on machine tools will be greatly simplified in the future.

G. A. Spohn, electrical engineer, General Machinery Corp., and W. S. Oswald of Westinghouse's generator division gave a description of the recently installed 40-ft. adjustable housing boring mill now in use by the generator division and largest of its type in the world. The description was followed by a group inspection of the big mill by the delegates.

Afternoon of the first day, Monday, was devoted to motors. A. H. Heywood, manager of Westinghouse's motor and generator sales section, described the changes made in the small-motor redesign that took place last October, and their effect on machine tool manufacture. Increased horsepower have been assigned to NEMA frame sizes 224 and 204, and a new frame size, the 203 has been introduced. Unventilated and totally enclosed fan-cooled motors are still on the old frame sizes and are not now interchangeable with the new continuous duty open motors. There is no rerating program planned on frames 225 to 326 (up to 15 hp. at 1750 r.p.m.), but a rerating program on frame sizes from 365 to 505 will probably be effected in the near future, Mr. Heywood said. The change will mean a reduction of at least one frame size. Chief technical advance responsible for this change is the use of new transparent plastic wire covering of high dielectric strength.

T. C. Fockler, Westinghouse motor engineer, discussed comparative methods of dynamic balance measurement of motors and demonstrated how insensitive is the usual method of testing a motor on a surface plate and measuring the frame movement with a Davey vibrometer. He proposed that in the future motors be tested on an

elastic support consisting of a helical spring with a natural period of vibration about one-quarter that of the motor at test speed. When tested in this way, a precision motor, such as is called for in driving a grinding wheel spindle, should not show a total amplitude of vibration of more than 0.0002-0.0003 in. The new Westinghouse reed type of vibrometer was also demonstrated.

Tuesday's session began with C. B. Stainback, manager of Westinghouse industrial sales, speaking on the subject "Looking Toward Defense." At the conclusion of his talk, he introduced the key speaker of the forum. Howard Dunbar of OPM. Following Mr. Dunbar, and continuing on a defense theme, G. A. Spohn of the General Machinery Corp. talked on "Machine Tools for Big Guns." Mr. Spohn described how large caliber naval guns are made in turning and boring lathes, which in some types are over 200 ft. in length. Then James R. Weaver, manager of the new Louisville Ordnance division of Westinghouse, recited the part that Westinghouse is playing in the national defense program. The company is now building two ordnance plants, one at Louisville, Ky., the other at Canton, Ohio, to manufacture armament equipment for the Navy. Out of a total expenditure of \$20,000,000 for these projects, more than \$11,000,000 will be for machine tools and other equipment. The two plants, which will be financed by the Navy, will contain 500,000 and 600,000 sq. ft. of manufacturing space respectively, and will be ready for occupancy about July 1. Most of the equipment has already been ordered and shipment of it is being expedited by the OPM. In addition, Mr. Weaver listed about 15 other defense projects the company is undertaking, including the making of marine turbines at South Philadelphia works and Navy gun mounts at the Jersey City elevator works. Westinghouse booked over \$140,000,000 worth of defense business in 1940.

During lunch, delegates listened to A. C. Streamer, vice-president in charge of the East Pittsburgh division, and Andrew H. Phelps, general manager, purchases and traffic. Mr. Streamer emphasized

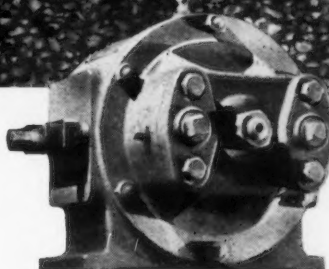
increased industrial production and facility expansion. Mr. Phelps cited the friendly cooperation between the machine tools and electrical industries, stressed its importance, and explained how continued effort along this line can aid in solving major production and design problems of the two industries just as it has in the past months of the present national emergency.

Philip McKenna, president of McKenna Metals Co., started the Tuesday afternoon meeting with his discussion of steel-cutting carbide tools, comparing the characteristics of Kennametal with high-speed steel. Dr. L. B. Osborne, research and development engineer for the Ohio Crankshaft Co., explained the principles underlying the Tocco process of induction heating for surface hardening.



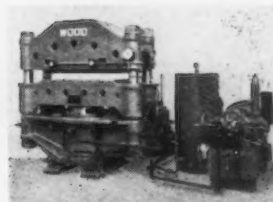
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"We must increase output." You hear that on every side of you today. There are many ways to increase capacity. Two obvious ones are to buy more equipment or to increase the existing productive capacity of what you have. On machines driven with Hele-Shaw Fluid Power (oil under pressure) it is often possible to step up the speed of a cycle or step up the number of strokes per minute without making any change in the design of the machine. Thus, if the machine is capable of operating at a higher rate, Fluid Power will give that extra capacity. This interesting and timely benefit from using Hele-Shaw Fluid Power is only one of its many advantages. Others are explained in our catalog for which we invite you to write.



THE Hele-Shaw Fluid Power Pump

Hele-Shaw Pump with Type F regulator. This is one of many automatic Hele-Shaw regulators.



R. D. Wood 500-ton leather embossing press with 22" main ram. Powered by a Hele-Shaw Pump with a Type F Control and locking Type B Control.

OTHER A-E-CO PRODUCTS: LO-HED HOISTS, TAYLOR STOKERS, MARINE DECK AUXILIARIES



AMERICAN ENGINEERING COMPANY

2410 ARAMINGO AVENUE, PHILADELPHIA, PA.

Last paper of the day was by G. A. Caldwell, Westinghouse industrial engineer, and analyzed A-C power distribution systems for industrial plants. Mr. Caldwell illustrated by diagrams a new network system of power distribution in industrial plants wherein a number of medium sized, air-cooled power transformers are operated in parallel and interconnected through a secondary grid system, in place of a single large outdoor transformer with radial distribution to the various machine load points. With the network system, short circuit currents are kept to a minimum, faults can be isolated without interrupting machine operation and much better voltage regulation is possible.

Wednesday morning began with H. G. Keller, P.I.V. division engineer of the Link-Belt Co., speaking on "Mechanical Devices for Infinitely Variable Speed." S. G. Leonard, electrical engineer of the Fellows Gear Shaper Co., traced the progress of "Electricity in Machines for Manufacturing Gears"; and the last paper of the forum was delivered by O. G. Rutemiller, Westinghouse Detroit division engineer, on the subject of "Wiring Arrangements for D-C Control Functions." He showed by a series of diagrams the various circuit arrangements and protective devices used to start d.c. motors. In some of these circuits, advantage is taken of the fact that a d.c. motor can be operated as a generator and serve as a dynamic brake in stopping. Various means must be provided to protect the motor and driven device against overspeed occurring from loss of field.

Batt Given Gantt Medal


••• William L. Batt, deputy director, OPM Production Division, on April 23 was given the 1940 Henry Lawrence Gantt Memorial gold medal for "distinguished and liberal-minded leadership in both private and public affairs." The award was made in Philadelphia at the 2-day defense conference sponsored by the American Society of Mechanical Engineers.

1357 Machines Partly Idle At Canton, Ohio

Canton, Ohio

••• A survey of available defense production equipment completed here shows 1357 machines are idle a total of 180,336 hr. per week in 45 shops.

The study made by the Canton of Commerce, which recently hired a full-time inspector to collect information through personal plant visits, will be used to bring more defense production to Canton. The report did not list equipment of several of the major Canton factories which are already at peak production and face no problem in obtaining work. A break-down by types of equipment has been made as follows:



Machine	No. on Hand	Hours in Use Per Week	Hours Not in Use Per Week
		Week	Week
Engine lathes	151	3,977	21,391
Turret lathes	44	2,391	4,951
Auto screw machine	10	358	1,322
Spin lathe	11	905	943
Shaper	59	1,343	8,569
Planer	25	571	3,629
Milling machine	65	1,458	9,462
Vertical boring mill	10	325	1,355
Horizontal boring mill	8	167	1,177
Radial drill	18	873	2,151
Drill press	163	4,066	23,318
Multiple drill	18	830	2,194
Keyseater	7	73	1,103
Grinder	88	1,472	13,312
Saw	70	3,245	8,515
Press	242	10,518	30,138
Shear	29	1,125	4,872
Arc welder	50	3,978	4,422
Spot welder	42	1,721	5,335
Acetylene welder	47	1,681	6,215
Broach	8	541	803
Gear cutter	1	15	153
Surface plate	13	91	2,093
Furnace	49	1,857	6,375
Paint equipment	20	841	2,319
Wire working	10	107	1,573
Rubber working	17	1,482	1,374
Miscellaneous	82	2,504	11,272
Totals	1,357	48,515	180,336

Each company's equipment has been charted with the individual firms listed by number. The 45 companies have a total of 1848 male and 336 female employees.

According to Dallas Hostetler, manager of the Chamber, complete

specifications of all machines are immediately available. They include size, age, tolerance, capacity, make, condition, etc. Floor space and railroad connections of each plant have been obtained, with other pertinent data.

All machines rated as being in AA condition are under five years old, or very carefully maintained or rebuilt during that time, according to Hostetler. Other designations are Classes A and B, the latter being machines occupied on work requiring not too close tolerances.

Hundreds Seek Revere Metal Working Defense Prize

••• With many hundreds of applications pouring in from all parts of the country the \$10,000 Revere Award, for the best suggestions by workers in the metal working industries for devices or processes to help speed American industrial defense, will close at midnight on April 30. C. Donald Dallas, president of Revere Copper & Brass Inc., which is sponsoring the award, announced that the deadline would not be extended. Nine winners will be selected by a committee of judges representing science, industry, labor, and the Army and Navy. Awards range from \$5000 to \$250.

National Bronze Installs New Heat Treating Furnaces

••• National Bronze & Aluminum Foundry Co., Cleveland, has purchased three new heat treating furnaces. The first unit, with a 10,000 lb. daily capacity, is now operating seven days a week. The second unit is almost completed and the third will be completed at the end of April. The units consist of two radiant tube gas fired batch type horizontal heat treating furnaces and one direct fire, giving two types for flexibility in handling a wide range of alloys required for all work. When the furnaces are all in operation, National Bronze & Aluminum Foundry will have a capacity of 38,000 lb. daily, and operating seven days, will be capable of turning out over a million pounds of heat treated castings a month.

Wages Advanced 5c By International Harvester

Chicago

• • • More than 42,000 employees of International Harvester received a 5c.-an-hour wage increase on April 18, effective April 14. Increase applies to all hourly-paid and piece-work employees in the motor truck, tractor, farm implement and twine factories. Salaried non-managerial workers receive comparable increases. The raise was discussed with bargaining committees at all plants where recognized bargaining agencies exist.

At Milwaukee, J. E. Harris, works manager for International Harvester, has notified the CIO that it cannot bargain with that union because it is not certified to represent the firm's 3500 workers there. The union called upon the company for a 10c.-an-hour wage increase.

Six International Harvester plants out of 19 have been placed on a 6-day, 48-hour week. Employees approved the step up in the interest of defense production and will receive time and one-half for the extra 8 hrs. worked. Plants affected are McCormick, Tractor and West Pullman works, all in Chicago; Rock Island and Rock Falls, in Illinois, and Richmond, Ind., works.

Some Firms Not Wholly In Steel, Purnell Says

Youngstown

• • • Frank Purnell, president of Youngstown Sheet & Tube Co., told Sheet & Tube stockholders April 22 that in stabilizing steel prices, companies depending on the steel business alone for their profits must be considered apart from those which earn from other sources than steel-making. Recent steel and coal wage increases will cost Sheet & Tube \$7,000,000 a year, he said.

Woodward Lifts Wages 10c.

Birmingham

• • • Woodward Iron Co. last week increased wage rates by 10c an hour. H. A. Berg, Woodward president, said the increase applies to approximately 1500.

We'll Handle Reds, UAW Leader Says

South Bend, Ind.

• • • "We'll run those Reds out ourselves, we won't need anti-strike legislation," an official of the Studebaker local of the United Automobile Workers (CIO) told THE IRON AGE. "The Auto Workers union is cleaning Communists out right and left, and have been doing it for some time."

The official stated that it was always easy to spot a Communist-dominated meeting and that it was easy to block their strategy if leaders kept alert. "They use the same tactics every time," he said. "These fellows get into our union activities because of the carelessness of the loyal American members. Too many men take their union for granted and figure the other fellow can do the work. With the Reds, no job is too big for them. They'll do anything, any time and before you know, they've become so active and prominent that they just naturally begin to take over leadership."

Wage Rise To Cost Acme Steel \$500,000

Chicago

• • • Operating costs increase of more than \$500,000 a year will be the share of Acme Steel Co. as the result of steel wage increase. This was revealed to stockholders by Charles S. Traer, president. The firm's first quarter net profit amounted to \$963,474, compared to last year's \$384,254.

Half Pullmans Backlog Covers Defense Products

Chicago

• • • Over \$43,000,000 — almost half of total unfilled orders of Pullman-Standard Car Mfg. Co. — are for defense, such as shells, gun carriages, airplane wings. The other half of production is on freight cars, so vital to defense, that Pullman could actually claim its production is devoted 100 per cent to the rearmament program. A freight car rolls out of the Michigan City plant every 10 min.; while one comes off every 15 min. at the smaller Bessemer, Pa., shop.

NLRB Approves New AFL Harvester Co. Unions

Chicago

• • • New AFL unions at International Harvester Co. have been upheld by the NLRB, which branded as false CIO charges that the unions were company dominated. The AFL unions were organized after the CIO had called strikes at various Harvester plants. New unions exist at the company's McCormick and West Pullman works in Chicago; and in Rock Falls, East Moline and Rock Island, Ill.

Niles-Bement-Pond Lifts Salaries and Wages

Boston

• • • The Niles-Bement-Pond Co. has announced that all hourly and salaried employees as of July 1 will be paid additional compensation of 8 per cent of total earnings.

J & L, SWOC Sign New Contract

Pittsburgh

• • • Jones & Laughlin Steel Corp. and the SWOC last week reached an agreement on a new contract embodying substantially the same points as those included in the Carnegie-Illinois - SWOC contract. The Jones & Laughlin agreement, however, provides for the SWOC as exclusive bargaining agent.

Decatur Iron Lifts Its Capacity By 25%

Decatur, Ala.

• • • Decatur Iron & Steel Co. is building an addition to its structural steel department that will increase fabricating capacity 25 per cent, H. R. Davis, president, announced.

Wage Strike Closes Evinrude

• • • The Evinrude Division of Outboard Marine & Mfg. Co. at Milwaukee, has been closed by a strike of about 500 production employees over a wage increase disagreement. The firm has about \$100,000 in orders for the Navy.

A.M.A. Production Group To Discuss Subcontracting

••• How to step up production without the purchase of major factory equipment will be discussed at a meeting of the American Management Association's Production Division, to be held on May 21 and 22 at the Hotel Astor, New York. Twenty speakers will relate brief experience stories on how they increased their company's production under this limitation. The second day will be devoted to a series of discussion sessions at which the principal topics will be: Subcontracting for Increased Production; Quality Control; Work Simplification; and Training.

Can Institute Studies Tin Savings Program

••• More than 15% of the tin now used by can manufacturers may be saved without discriminating against any single group of can users, Ferris White, vice president of the Can Manufacturers Institute, Inc., reports. "This can be achieved," explained Mr. White, "first, by reducing the weight of the coating of tin on cans by 10 per cent (such a reduc-

tion could be effected on 95 per cent of the present food containers), and, second, by the savings which could be effected by switching from tin plate to other types of coated steel; for example, some products, such as paint, oil, and gasoline, may be packed in containers made of terne plate."

Gear Manufacturers Annual Meeting at Hot Springs

••• American Gear Manufacturers Association will hold its 25th annual meeting May 5-7 at Hot Springs, Va., where a tentative program includes addresses on Monday, May 5 by Dr. N. E. Woldman of the Eclipse Aviation Corp., on "Machinability of Alloy Gear Steels," and by E. L. Shaner, editor of *Steel*, on "Procurement of Materials for National Defense." M. Maletz, of Kearney & Trecker Corp., will speak Tuesday morning, May 6, on "Analytical Determination of the Form Factor in the Beam Formula for a Tooth." Paul Wooton, of the McGraw-Hill Washington staff will speak at a dinner Tuesday evening, while J. L. Buehler, of the Indiana Gear Works, will make an address Wednesday, May 7, on "Problems of Aircraft Gear Manufacture."

American Steel Warehouse Chapters Elect Officers

Cleveland

••• The following chapters of the American Steel Warehouse Association have elected officers for the coming year, says W. S. Dowsy, executive secretary:

Baltimore Chapter: President, George J. Parke, Eagleston-Parke, Inc., Norfolk, Va.; vice-president, H. A. Lowry, Seaboard Steel & Iron Corp., Baltimore; secretary, J. D. Boan, Scully Steel Products Co., Baltimore. Mr. Parke was also elected as national director.

New England Chapter: President, J. B. McIntyre, Scully Steel Products Co., Allston, Mass.; first vice-president, Quincy W. Wales, Brown-Wales Co., Boston; second vice-president, G. A. Putnam, George F. Blake, Inc., Worcester; secretary-treasurer, C. S. Harvey, Arthur C. Harvey Co., Allston, Mass.; chapter director, G. M. Congdon, Congdon and Carpenter Co., Providence, R. I.

Northern California Chapter: President, H. E. Oliphant, Tay-Holbrook Co., San Francisco; vice-president, J. C. Hickinbotham, Hickinbotham Bros., Ltd., Stockton; vice-president, Curtiss Hayden, Dunham, Carrigan & Hayden Co., San Francisco. Mr. Oliphant was also elected as national director.

Pacific Northwest Chapter: President, W. A. Haseltine, Portland, Ore.; vice-president, R. P. Mercer, Jacobs & Gile, Inc.; secretary-treasurer, H. F. Morrow, Pacific Metal Co.; national director, J. N. Barde, Barde Steel Co., all of Portland.

Southern Chapter: President, I. W. Tull, J. M. Tull Metal & Supply Co., Inc., Atlanta, Ga.; vice-president, Phil Pidgeon, Pidgeon-Thomas Iron Co., Memphis, Tenn.; secretary-treasurer, George W. Smith, Southern Steel Co., Birmingham, Ala. Mr. Tull was also elected as national director.

Southern California: President, E. Jungquist, Percival Steel & Supply Co., Los Angeles; vice-president, J. L. Robertson, A. M. Castle & Co.; vice-president, Donald Priest, Los Angeles Heavy Hardware Co.; secretary-treasurer, L. B. Yeaton, H. W. Hellman Bldg., all of Los Angeles. Mr. Jungquist was also elected as chapter director.

Wisconsin Chapter: President, G. W. Smith, Joseph T. Ryerson & Sons, Inc., vice-president, John Pritzlaff, John Pritzlaff Hardware Co.; secretary-treasurer, Fred O'Dell, Edgar T. Ward's Sons Co., chapter director, George Gibbs, Gibbs Steel Co., all of Milwaukee.

Amsler-Morton Co. Has Orders For 36 Soaking Pits

Pittsburgh

••• With the receipt of a new order from a large mid-western steel company for 12 AMCO recuperative pit furnaces, Amsler-Morton Co. has a total of 36 soaking pits on order or under construction. Since March, 1936, this company has installed or received orders for 107 pit furnaces, most of them of an extra large size, with a total estimated heating capacity of over 8,000,000 ingot tons per year.

INSIDE AN OPENHEARTH: When the UAW went on strike recently at the Ford Motor Co.'s Rouge plant, an openhearth furnace in which steel was being made was left unattended. As strikers argued with supervisory employees, the furnace backfired. This photograph shows a view from inside the furnace.



Electrochemical Society Hears Talk By Osborn

Cleveland

• • • Inherent characteristics of surface hardening by induction were explained before the 79th meeting of the Electrochemical Society, Inc., here April 18 by H. B. Osborn, Jr., of the Ohio Crankshaft Co.

Among Mr. Osborn's salient points were the accuracy of control offered by induction surface hardening; reproducibility of results; minimum of distortion and no scale; elimination of expensive heat treating and straightening costs; time savings and rapid carbide diffusion.

The speaker also asserted that the process yields two to three points higher Rockwell C hardness for given carbon content contrasted with other hardening methods and that a finer and more homogeneous martensite structure may be obtained.

Mr. Osborn's paper included description of numerous applications of the Tocco process, discussion of frequencies and descriptions of equipment. Other high spots of the convention included:

Declaration by Dr. W. E. Wickenden, president Case School of Applied Science, Cleveland, that America should set up priorities on trained technical men as a vital part of its defense program. "Normal output" of technical schools is far below the expected demand for trained technicians and supervisors, he added.

Statement by Dr. C. G. Fink, secretary of the society, that electro-chemistry is playing a big part in the current defense program: "Through electro-chemistry," he said, "the antimony now imported from Asia and Africa for use in submarines as electric battery plates can be replaced by domestically produced calcium. Since gas warfare will probably be the final desperate phase of the present war, American electro-chemists are developing methods of producing chlorine gas which will be part of our defense program."

Election of Raymond R. Ridgway of Chippewa, Ontario, to the presidency of the society. Award of the Weston Fellowship of \$1000 to R. E. Black of Pawhuska, Okla., for his work in electro-plating.



PISTONS AND ROCKER arm assemblies for the 14-cylinder Wright "cyclone" engine will be manufactured by Hudson Motor Car Co. as subcontractor. Above are H. Murray Northrup, Hudson chief engineer, and I. B. Swegles, vice-president in charge of manufacturing for Hudson.

The convention heard a talk by Dr. Matthew Luckiesh, director of lighting research laboratory of General Electric Co. here on the subject of "Light."

Methods of electric glass welding and experiments with battery plates were among topics discussed.

Heavy Forging Makers To Suggest Speedup Plan

Washington

• • • Eighteen manufacturers of heavy forgings were named at a conference April 16 with OPM, Army, Navy and Maritime Commission representatives to submit suggestions for speeding up deliveries of forgings for ships and big guns by changes in specifications and the substitution of more plentiful materials for scarce metals. Relaxation of tolerances, an OPM statement said, is one possibility being explored to speed up deliveries.

Resistance Welders Prize Contest Under Way

• • • Cash prizes totaling \$700 are being offered again this year for technical papers on resistance welding subjects in a contest sponsored by the Resistance Welder Manufacturers Association. The contest, which opened Sept. 30, 1940, and closes August 31, 1941, is open to anyone from the United States, its possessions and Canada, as well as to members of the American Welding Society throughout the world. Information may be obtained from the Resistance Welder Manufacturers Association, 505 Arch Street, Philadelphia, or from the American Welding Society headquarters, 33 West 39th Street, New York.

Boston Welding Society Section Meets April 25-26

• • • The Boston section of the American Welding Society will hold its first New England conference at the Massachusetts Institute of Technology, April 25 and 26. J. H. Zimmerman, development manager, Linde Air Products Co., New York, will talk on modern applications of flame cutting processes. Dr. W. G. Theisinger, director of welding research, Lukens Steel Co., Coatesville, Pa., will talk on weldability of steels.

J. H. Cooper, welding engineer, Taylor-Winfield Corp., Warren, Ohio, will discuss welding in machine design, and J. Babin, engineer, sales promotion division, Chase Brass & Copper Co., Waterbury, Conn., welding of copper and red brass.

Dr. W. F. Hess, department of metallurgy, Rensselaer Polytechnic Institute, Troy, N. Y., will deliver a paper on developments in resistance welding, and La Motte Grover, structural welding engineer, Air Reduction Sales Co., New York, a paper on the welding of steel structures.

Edward R. Fish, chief engineer, boiler division, Hartford Steam Boiler Inspection & Insurance Co., Hartford, Conn., will talk on inspection of boiler welds, and R. W. Clark, welding engineer, works laboratory, General Electric Co., Schenectady, N. Y., on qualification of welding operators and processes.

Growing Tightness In Metals Forecast For Detroit A.S.T.M.

Detroit

• • • A steadily increasing tightness in all supplies of metals, ferrous and non-ferrous, was the rather gloomy forecast presented by various technical speakers appearing last Friday evening at Hotel Statler, Detroit, before the sixth annual spring meeting of the Detroit section of the American Society for Testing Materials. Shortages in many cases will continue to press the auto industry until 1943, it was indicated.

Only among certain non-metallic materials was the prospect painted bright, and even in some of these instances some possible tightness was envisioned.

Automotive-wise, the defense program will result shortly in "guns instead of glitter," according to Dr. J. S. Laird, of the Chemical and Metallurgical department of Ford Motor Co., who discussed non-ferrous metals. He predicted that nickel for automotive plating might not be available at all next fall, although requirements have recently been revised to permit considerable reduction in thickness of this plate on auto parts as a conservation measure.

There is pressing need for development of methods for special accelerated weather tests to determine efficacy and durability of chromium plating directly over copper, he asserted.

If bright metal plate is entirely eliminated, and there is possibility of this being forced on the industry, there will be increased use of lacquers, enamels and plastics, although the latter will have some limitations, Dr. Laird suggested.

In certain applications, nickel is regarded as an essential in automobiles, he pointed out. For spark plug wires, high-temperature coils in lighters, highly stressed parts like springs in ignition distributors, nickel alloys are virtually indispensable; similarly, 36 per cent nickel material (Invar) for bimetal temperature gaging and 32 per cent nickel iron for compensating shunts in voltage regulators are necessary.

These uses, however, put no heavy drain on nickel supplies.

Other materials discussed by Dr. Laird included aluminum, for engine pistons, timing gears and brake pistons. Iron and steel substitutes were proposed, with bakelized fabric named as a substitute for timing gears and permanent mold cast iron and sintered iron powder for the brake pistons. Zinc, "a cheap metal, has become annoyingly prominent," he said, adding that there is difficulty in obtaining two tons a week for plating purposes. In 1941 model automobiles its use for diecastings will be greatly reduced.

OPM Defense Zinc Pool To Be Enlarged

• • • The zinc pool from which the OPM Priorities Division may make mandatory allocations to meet urgent defense needs is to be raised from 5 per cent of production to 17 per cent for May.

For April, producers of slab zinc were required to set aside an amount of the metal equal to 5 per cent of January production. For May, the 17 per cent pool will be based on March production and should amount to approximately 12,000 tons.

A proposed order for allotment of zinc to the industry was set forth as follows: 1. Galvanizing for protection; 2. Metal for functional parts such as carburetors; 3. For use in brasses and bronzes for which there are no reasonable substitutes, and 4. For other functional parts.

Present storing of brass billets, aluminum ingots and other basic supplies was called a necessary step to permit greater production. It was pointed out that three to ten tons of material must pile up before a single ton of product can emerge from a fabricating plant.

To meet requirements for defense items, the steel industry must produce continuously at a rate greater than its normal rated capacity, but it already is severely handicapped by a 12 per cent shortage of beehive coke, and there is no way to make up the deficiency which is resulting from labor trouble in the coal industry, according to E. C. Smith, chief

metallurgist of Republic Steel Corp.

Once told that the required quota of tank armor would be 4000 tons a year, his company had already reached the point of shipping that much in a single month, he said in explanation of the difficulties which industry is facing in its attempts to meet today's demand for materials for the defense industries. The demand for electric furnace steels is so great as to tax the electric power producing facilities of the nation, he said.

Nickel alloy demand will be so great under the expanded aviation program that aviation alone can use up more nickel than can be provided for all industry a year and a half from now, the speaker asserted. Output of stainless faces severe limitations because of the nickel situation, but curtailment in stainless output will free large quantities of chromium for other uses. The extreme shortage of chromium will last about three months; on nickel it will continue for about 18 months, it was stated.

A new use of molybdenum for cores of 0.50 cal. bullets will account for consumption of about ten per cent of the nation's molybdenum before long, it was predicted.

Chemicals and rubber appear to be reasonably plentiful, although transportation difficulties might enter in either case to reduce supplies. Hysteria and overbuying also could produce bad effects in the chemical industries. These conclusions were offered by Dr. J. K. Hunt, of E. I. duPont de Nemours & Co., Inc., speaking on chemicals, and Dr. S. M. Cadwell, U. S. Rubber Co., speaking on rubber.

Dr. Hunt assured ASTM members that there would be plenty of "butter" as well as guns, but said that the butter might not be "so thick." With natural oils and varnishes for automobile finishes largely replaced by synthetics, he indicated that there should be no difficulty in getting auto finishes. Some materials, such as aluminum flake for metallic finishes, and chromates to produce yellows and greens in paints, are restricted or cut off. There probably will be no metallic paints for 1942 autos, but organic materials will provide

all necessary colors, Hunt said.

Available capacity in the plastics manufacturing industry will apparently be sufficient to meet any demands that arise, and the industry is not dependent on imported ingredients.

Real concern exists about the capacity for producing enough sodium cyanide to meet demands for case hardening, Dr. Hunt declared.

Rubber has been stock-piled extensively by industry and by the government, Dr. Cadwell said. Including finished stocks, there is approximately a one-year supply available. If shipments are ever cut off, guayule rubber, a domestic material, could be made available in increasing quantities, along with South American supplies and synthetics. On the latter, 1500 man-years of research has been done and plant capacity is being increased now.

J. L. McCloud of Ford Motor Co., chairman of the Detroit district committee, ASTM, presided at the symposium.

Tungsten Needs for Carbides Increase Rapidly

Worcester, Mass.

••• Tungsten requirements for the production of tungsten carbide cutting tools for U. S. consumption alone will probably reach 25,000 lb. per month during the defense program, according to W. G. Robbins, president, Carboly Co., Inc., Detroit. Speaking recently before the American Society of Tool Engineers here, Robbins said that the monthly consumption of tungsten for this purpose is already greater today than the consumption for the entire year of 1938, but that every pound of tungsten used for these tools "frees" around 100 lb. of tungsten for other purposes.

"We are now going through the same cycle Great Britain has gone through since 1936 and Germany even before that—a tremendous expansion of the use of carbide tools for armament production in order to increase productivity per man and per machine, reduce the number of machines needed, cut production costs, and conserve tungsten as a raw material," Robbins said.

Tin Recovery Seen Yielding 12,000 Tons

••• Technical developments now under way or pending can do much to remove tin from the list of strategic materials, a National Academy of Sciences committee concludes in a report to the OPM.

Twelve thousand long tons of tin can be recovered annually from used tin cans in the U. S. by detinning plants if costs are dis-

Wrigley Aluminum Sold to Government

Chicago

••• The 500,000 lb. of aluminum billets sold by the William Wrigley, Jr., gum company to the government have been on the way to becoming airplane wings for more than two weeks. The 300-lb. billets were sent to furnaces in Louisville, Ky.

regarded and if can collecting agreements are worked out with U. S. cities, the committee reports. Forty thousand out of 70,000 tons of tin consumed in this country in 1939 was used in coating steel containers, and about half the used tin cans can be economically collected for tin removal. Potential supply of steel scrap from old tin cans is estimated at 1,000,000 tons a year. The committee noted that:

"(a) The use of non-metallic containers is increasing substantially, so much so that at least one of the more important can manufacturers has definitely entered the non-metallic container field.

"(b) The use of quick frozen fruits, vegetables, meat, and fish is expanding rapidly the use of non-metallic containers generally.

"(c) Tin plate bearing less than 1 per cent of tin is being used for dry-pack materials more extensively.

"(d) Active research is rapidly approaching a stage where suitable non-metallic coatings for sheet steel will be available for containers for certain products now preserved in tin-plate containers."

In referring to the decreased

use of tin in soft solder, the committee also listed examples. It said that the amount of tin per passenger automobile has been steadily reduced and that it is reported one new model on the market has eliminated the use of body solder; that the electric industry is steadily reducing its usage of soft solders.

Other reduced usages of tin are set forth, such as: Tinfoil condensers are nearly extinct and it is technically possible to eliminate the use of wiping solders by the adaptation of old arts for making lead cable joints; use of tin salts in the textile industry has all but disappeared; tin foil for wrapping or packaging has been largely displaced by aluminum foil; aluminum has been shown to be possible in the manufacture of collapsible tubes, but its use has not become general; nickel silicon and aluminum alloys of copper have developed and are increasingly coming into use in place of tin bronzes; tin-containing bearing alloys have been displaced by other types of bearings in many types of machinery; water or oil-lubricating non-metallic bearings have come into use for heavy service; the railroads have greatly reduced their usage of high-tin engine bronzes.

Canada Cuts Civilian Aluminum Use 97 1/2%

Ottawa

••• Drastic restrictions placed upon civil use of aluminum have reduced non-war consumption from about 1000 tons monthly to less than 25 tons, C. D. Howe, Minister of Munitions and Supply, reports.

Revised Commercial Standard Adopted For Gage Blanks

••• A revised standard for gage blanks has just been released by the National Bureau of Standards, Department of Commerce, under the title, "Gage Blanks (Third Edition), Commercial Standard CS8-41." Copies (15c. each) are obtainable from the Superintendent of Documents, Government Printing Office, Washington.

Auto Output Cut 20% Starting Aug. 1 To Help U. S. Rearm

Washington

• • • A realistic approach toward solution of the problem of steel supply for national defense is seen in the announcement of OPM Director General William S. Knudsen that the automobile and trucking industry has accepted an initial 20 per cent reduction of motor vehicles for the model year beginning Aug. 1. Designed to make available more man-power, materials, facilities and management for the defense load now being made ready, Mr. Knudsen said that the reduction will amount to about 1,000,000 units.

Beginning with the automotive industry, the largest single consumer of steel, the OPM move is interpreted as an answer to claims of steel shortage. The action is taken to mean a switch from butter to guns, a policy of curtailing civilian demand rather than attempting construction of additional capacity. The Gano Dunn report has supported the steel industry's view that capacity built and being built is adequate, though giving recognition to the existence of temporary bottlenecks. By the practical policy of curtailing civilian demand on the part of such a large consumer as the automotive and others, it is expected to wipe out bottlenecks.

The automotive industry in 1939 consumed about 16.7 per cent of the nation's rolled steel. On the basis of 1939 figures, adjusted to the current domestic production of automobiles and trucks, it is estimated that during the 12 months ending this April automotive consumption of steel will aggregate 8,000,000 tons, of which 2,400,000 tons is alloy steel. A 20 per cent reduction in motor vehicle production, a ratio that may later be increased, would mean a saving of 1,000,000 tons of steel. In itself not a large figure as measured against steel capacity, similar reductions in other large consuming lines will reach a substantial total, and it is quite conceivable the percentage cut will be increased if found necessary.

Reduced steel supplies for the

G-M Drops '43 Model Change To Aid Defense

• • • General Motors Corp., through its chairman, Alfred P. Sloan, Jr., has notified the OPM that its tool shops are available for defense. In a letter to William S. Knudsen, OPM director general, Mr. Sloan said:

"We propose to eliminate the yearly model change of passenger cars that we normally make, applicable to the year 1943. This means that the 1942 model, which goes into production this summer, will be continued through 1943.

"On the first count, there would be released a very considerable amount of managerial technical talent that could be diverted to production and engineering problems involved in National Defense.

"On the second count, we spend on an average model change from \$35,000,000 to \$40,000,000. This involves tooling, almost entirely. Probably 90 per cent of this capacity could be diverted to defense purposes. In terms of production, there would be involved approximately 15,000,000 man hours."

automotive industry is given great significance as it bears on defense requirements. The kinds of steels it uses, particularly alloys and sheets, are especially pressing defense requirements. In the first two months of the current year, sheet production, a substantial proportion of which went to automobile manufacturers, was disproportionate to production of other products. Sheet production in January and February totaled 2,223,919 tons, or 22 per cent of the total semi-finished and finished output. In February sheet pro-

Consumption of Steel by Automobile Industry
(for 1939 in thousands of net tons)

		Percentage Automotive
Bars and shapes		
under 3 in.	1,312.8	31.5
All sheets except		
galvanized	2,573.3	41.0
Strip steel	1,129.8	51.3
All steel	5,396.2	16.7

Consumption of Other Products by Automobile Industry (for 1939 in tons)

Malleable iron.....	286,000	51.0
Gray iron	947,920	14.0
Aluminum	21,000	9.7
Copper	110,000	13.7
Tin	10,000	11.4
Lead	228,000	34.2
Zinc	76,000	12.1
Nickel	10,000	23.0

duction was 1,093,293 tons, or 107.3 per cent of capacity.

The Knudsen announcement, made on April 17, came on the same day that Secretary of the Navy Knox told the special Senate defense investigating committee that the Navy sees "future difficulties" which may cause a delay in defense production, in supplies of structural steel, aluminum, armor plate and steel forgings. He called the picture on steel forgings "probably the most important of all."

On the West Coast

[CONCLUDED FROM PAGE 79]

tions totaling 975,000 sq. ft., work on which was begun last October. More than 675,000 ft. of the additions were already occupied, giving the company a present floor area of 2,175,000 sq. ft. This does not include the company's Stearman Division at Wichita, Kan.

Douglas Aircraft Co. has scheduled completion of its new 200-acre \$12,000,000 "blackout" factory at Long Beach for early this summer. At present, the working area at the Douglas Santa Monica and El Segundo plants totals 1,940,000 sq. ft.

At San Diego, Consolidated Aircraft Corp. had completed and was utilizing 645,000 sq. ft. of factory space completed since the first of the year. Total working area at present is 2,345,000 feet, with completion of a new parts plant, covering an additional 1,593,000 sq. ft. anticipated by summer.

Lockheed Aircraft Corp., Burbank, now has a working area of 1,656,166 sq. ft. More than 50 per cent completed and partially occupied was the new plant of its affiliate, Vega Airplane Co., which had a total of 1,256,491 sq. ft. These four companies now have by far the largest Coast plants.

Henry J. Kaiser Co. and Todd Shipyards, Inc., have been granted \$6,000,000 by the Maritime Commission for constructing a six- or eight-way shipyard at Richmond, Cal. The new yard will operate under the name of Richmond Shipbuilding Corp., and will not directly integrate with the Todd-California Shipbuilding Corp., which is building 30 ships for Britain nearby.

Indiana Shares In Plane Industry Rise

Indianapolis

• • • An aviation boom has come to Indiana. The Allison plant located here has orders totaling \$235,000,000; Studebaker has more than \$50,000,000 in South Bend and Ft. Wayne, and Bendix Aviation Corp. in South Bend has received an \$18,000,000 federal loan for expansion of its facilities. In addition, more than \$50,000,000 in army air corps contracts are scattered with state firms.

There are 1500 WPA workers improving six state airports under awards reaching \$2,500,000; 17 state colleges hold quotas for 441 student fliers under the civil aeronautics authority civilian pilot training program.

Others involved in airplane production will be the new extrusion plant of the Aluminum Corp. of America, located in Lafayette, where strip and tubular aluminum for construction and fuselages will be produced. A magnesium alloy casting plant is under construction in Indianapolis. Ingersoll Steel & Disc Co. make armor plate at New Castle. Curtiss-Wright will build a \$7,000,000 propeller plant in Indianapolis. P. R. Mallory in the same city is turning out bomb sight releases. And Auburn Central Mfg. Co., Connerville, will make wings.

Water Tank Maker Bids On Fighting Kind

Chicago

• • • One manufacturer here recently wanted to bid on "tanks" and discovered to his dismay that the U. S. wanted 10-ton armored vehicles, and not the hot-water tanks he produced.

Texasteel Co. Gets Loan

• • • The RFC has agreed to participate to the extent of 75 per cent in a loan of \$150,000 to be made by The Fort Worth National Bank, Fort Worth, Tex., to Texasteel Mfg. Co., Fort Worth, for working capital and to purchase raw materials in connection with a shell contract.

Welding Conference to be Held At Lansing, Mich.

• • • A welding conference sponsored by the American Welding Society, Detroit Section, in cooperation with the Mechanical Engineering Department and the Short Course Department of Michigan State College, will be held at Lansing, Mich., April 25 and 26. Papers will be presented on "Atomic Hydrogen Welding" by L. G. Pickhaver, General Electric Co.; "Metallurgy of Weld Metal" by F. R. Hensel, P. R. Mallory Co.; "Electronic Controls" by E. H. Vedder, Westinghouse Electric & Mfg. Co.; "Welding of Aluminum" by G. O. Hoglund, Aluminum Co. of America; "The Development of Welding in the Aircraft Industry" by Frank Smith, Stout Skycraft, Inc.; "Maintenance of Resistance Welding Machines and Electrodes" by G. N. Sieger, S-M-S Corp.; "Stored Energy Resistance Welders and Their Place in the Defense Program" by S. M. Humphrey, Taylor-Winfield Corp.; "Pulsation Welding" by H. G. Cogan, National Electric Welding Machines Co.; "Designing for Arc Welding" by H. C. Hettersater, Harnischfeger Corp.; "Flame Hardening and Strengthening" by M. R. Scott, Linde Air Products Co.; "Welding of Stainless Steels" by H. C. Esgar, Carnegie-Illinois Steel Corp.

Great Lakes Steel To Roll Ship Plates

• • • Great Lakes Steel Corp., National Steel Corp. subsidiary, is making changes in its wide strip mill at Detroit to provide for the rolling of ship plates up to 1 in. thick. Buildings and additions are being made to the finishing end of the mill and the total cost will run approximately \$3,500,000, according to E. T. Weir, chairman.

American Brake Shoe Forges Millionth Shell

Chicago

• • • The 1,000,000th shell will be forged tomorrow (April 25) by the American Forge division of American Brake Shoe & Foundry. American Forge has defense orders for a variety of shell sizes and is reported to be well ahead of production schedules.

Coal Tieup Threatens Production of Steel

Pittsburgh

• • • Prolongation of the coal tie-up which has caused the majority of beehive ovens in Western Pennsylvania to become cold, has indirectly caused serious delay to production of steel for national defense purposes.

Even though the coal strike is settled this week, further curtailment in ingot output as the result of forced banking of blast furnaces is expected to extend into next week.

Many beehive coke operators in the Connellsville region found it necessary to draw out coke last week and with the miners still on strike it was impossible to load new coal, hence the ovens have become cold. Reliable estimates here indicate it will take 10 days before new coke can be produced, while an additional three days will be necessary to provide proper transportation from the coke ovens to the blast furnaces affected. This situation will become far more serious if the few thousand ovens which are now sealed in order to keep them hot have the coke drawn from them before fresh coal can be loaded.

If the coal strike is not settled this week one major steel producer may find it necessary to reduce operations to below 68 per cent of capacity. This same company, before the coal strike began, was operating at close to 100 per cent.

This loss of steel ingot output because of lack of pig iron has been that portion dependent upon beehive coke which has furnished the necessary marginal fuel in order to maintain raw steel output at record levels for national defense purposes. A continuation of the coal strike beyond next week, however, would soon begin to affect those companies which are operating blast furnaces on by-product coke inasmuch as these supplies are running low at some points due to the heavy production at by-product plants.

Steel foundries and other industrial concerns which have been dependent upon beehive foundry coke have already been affected by the coal strike.

OPM Surveys West Coast Steel Plants

Washington

• • • W. A. Hauck, OPM consultant on steel capacity and steel production, left Washington on Tuesday on a trip to the Pacific Coast to visit steel-making plants in the Los Angeles, San Francisco and Seattle areas and in Utah.

Mr. Hauck will also visit plants now making heavy steel forgings as well as representative steel warehouses and shipbuilding plants. An OPM statement said:

"The increasing steel requirements of the defense program on the Pacific Coast, especially from shipbuilding yards, make it advisable that a first-hand survey of this nature be made. It is essential that the Pacific Coast be assured of dependable and adequate sources to meet promptly its steel requirements as needed. This survey is to develop any further measures that may be found necessary and appropriate to facilitate and expedite steel deliveries on the Pacific Coast."

No information was obtainable at the OPM that the administration has recently had a private interest make a survey looking to the establishment of a fully integrated steel plant on the Pacific Coast. There are reports in circulation in Washington, however, that estimates for such a plant have been submitted to the government.

Engineer Proposes \$150 Million West Coast Steel Plants

Washington

• • • Henry J. Kaiser, West Coast industrial engineer, called at the White House on Tuesday, seeking Administration approval of a proposal to construct steel production facilities to cost \$150,000,000 in Utah, Southern California and the Bonneville power area.

Mr. Kaiser, who was accompanied to the White House by Senator Abe Murdock, Democrat of Utah, is president of the Henry J. Kaiser Co., one of the Six Companies, Inc., and builder of Boulder Dam and constructor of cement plants in the West.

United Engineering To Make Howitzers

Pittsburgh

• • • United Engineering & Foundry Co. which has its largest order backlog on record, principally for defense, will, in the next few months, begin shipment of 105 mm. howitzers to the Government from a newly equipped shop.

According to George T. Ladd, president, the company will be limited only by plant capacity and manpower during this year and possibly well into next year in producing for industry and national defense.

Two of the largest armor plate presses ever built are now under construction and the company has completed a number of "one shot" shell presses which are said to be operating quite satisfactorily.

New Wage Study Possible for Steel

Washington

• • • Government officials administering the Walsh-Healey Public Contract Act were represented this week as feeling that the recent wage increase ordered by large steel producers is substantial enough to justify a new wage study of the industry to determine the industry's prevailing minimum wage under the procedure set forth in the law. The effect of such a finding would be to compel small companies to pay the 10c. increase already made effective for employees of large units in the industry.

A Labor Department spokesman told THE IRON AGE that officials administering the Walsh-Healey Act are under a duty prescribed by law to make minimum wage determinations in industry whenever minimum wage scales undergo a radical change.

First Quarter Earnings

	1941	1940
Jones & Laughlin Steel Corp.	\$4,160,507	\$1,134,611
Crucible Steel Co. of Amer.	3,044,270	1,193,156
Sharon Steel Corp.	527,253	309,576
Acme Steel Co.	963,474	384,254
Keystone Steel & Wire Co.	410,137	279,386
M. A. Hanna Co.	747,210	390,238
Blaw-Knox Co.	584,853	.....
Mullins Mfg. Corp.	230,044	52,951
Wickwire Spencer Steel Co.	*231,172	*(def) 262,701

* Before taxes

Navy Signs \$12 Million Contract With Midvale

Washington

• • • The Navy Department has entered into a contract with the Midvale Co., Nicetown, Philadelphia, for the acquisition and installation at the company's plant of special additional equipment and facilities at a total estimated cost of \$12,970,200 without profit or fee to the contractor.

The Department's Bureau of Yards and Docks has awarded a contract for a shipbuilding dry dock at Charleston, S. C., to the MacDougald Construction Co., Charleston, on a fixed-fee basis. The estimated cost, including fee, of the contract is \$2,465,000.

• • • The War Department has awarded a \$9,907,427 contract to the Mack Mfg. Corp., Long Island City, New York, for transmission control differentials and final drive assemblies for use in tanks. In connection with this supply contract, the War Department has entered into a secondary emergency plant facility agreement with the Mack corporation for expansion of its plants at Allentown, Pa.; New Brunswick and Plainfield, N. J., in the amount of \$282,000 for providing the necessary machinery and equipment in the existing plants for the production of these tank parts.

Henderson Ends Private Donations of Scrap

Washington

• • • Private donations of iron and steel scrap to Great Britain have been stopped by the Office of Price Administrator Henderson, though the purpose of those collecting scrap and getting credits from steel makers to apply on British accounts was well intended. Henderson's office felt that the move would lead to speculation and a possible increase in ceiling prices of scrap to the detriment of both the United States national defense program and to the British. The collection movement originated in the Southwest but gathered no important headway. Scrap was donated by such concerns as oil well interests. Since no new sources of collection were developed no relief was afforded in the way of supplies.

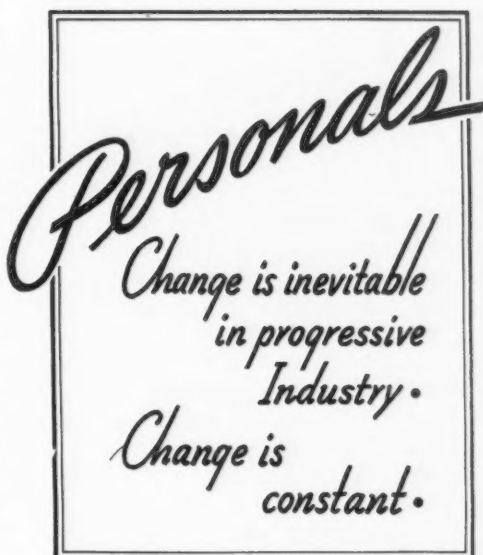
• **Donald S. Walker**, for several years general sales manager of Combustion Engineering Co., Inc., New York, has been named vice-president in charge of sales. After graduating from the United States Naval Academy in 1924, he joined D. H. Skeen & Co., Chicago, where he was in charge of Ljungstrom Air Preheater sales, becoming vice-president of that company and subsequently president of its subsidiary, the Mercon Regulator Co. He joined Combustion Engineering Co. in 1934 as manager of the Philadelphia district. Replacing Mr. Walker as general sales manager is **H. G. Ebdon**, former assistant general sales manager. Receiving his technical education at Cooper Union and at Brooklyn Polytechnic Institute, Mr. Ebdon joined Combustion Engineering in 1917 after having been associated with the Consolidated Gas Co. and the Wilputte Coke Oven Co.

• **James R. White** has resigned his post of president of Rickard & Co., Inc., New York, which he has held for the past three years to accept the position of director of sales of the Clover Mfg. Co., Norwalk, Conn. **H. L. Fisher**, for 13 years vice-president of Rickard & Co., has been elected to succeed Mr. White as president.

• **A. L. Patrick**, formerly executive vice-president and treasurer,



Donald S. Walker, vice-president in charge of sales of Combustion Engineering Co., Inc., New York.



has been elected president of the Cleveland Automatic Machine Co., Cleveland, succeeding **Walter F. Brown** who has resigned from that position but remains as a member of the board of directors. **Col. James Hammond**, former Memphis newspaper publisher has been elected a director and treasurer and **G. V. Patrick** has become vice-president in charge of sales.

• **James E. Bottoms** has joined the roll sales division of Mesta Machine Co., Pittsburgh. Mr. Bottoms began his career in the steel industry in 1926 when he joined the American Rolling Mill Co. in Ashland, Ky., but was later transferred to the Butler works, where he was made superintendent of the cold mills. He served in a similar capacity at Wheeling Steel Corp. and Jones & Laughlin Steel Corp. before going, in 1938, to England where he became manager of the hot and cold strip mills of Richard Thomas & Co., Chester.

David Lyle, who has been in the sales department at Mesta's general offices in Pittsburgh, has been made traveling representative in the roll and rolling mill sales division.

• **Anthony J. Chenis** has been put in charge of the Bullard-Dunn Process laboratory, a division of the Bullard Co., Bridgeport, Conn. Mr. Chenis was graduated from Holy Cross College in 1935, receiving a two-year teaching fellowship from Boston College. After studying metallurgy at the Massachusetts Institute of Technology, he joined Blacher Brothers, where he

was in charge of finishing and plating.

• **Ralph M. Hoffman** has been elected vice-president in charge of sales for the Link-Belt Co., Chicago. Mr. Hoffman, who received his degree in mechanical engineering from the University of Minnesota in 1911, has been assistant to the president since January, 1940. He joined Link-Belt in 1923 as manager of Link-Belt Meese & Gottfried Co.'s Seattle branch. He served in this capacity until 1931, the name of the Pacific Coast subsidiary meanwhile becoming Link-Belt Co., Pacific Division; and from 1931 to 1939 served as vice-president and sales manager of this subsidiary, with headquarters at San Francisco.

• **R. M. Beutel** has been elected secretary and a director of Pater-son-Leitch Co., Cleveland. He has been with the company 15 years. **William J. Burkhardt** has been elected assistant treasurer.

• **Ralph Todd**, factory manager of National Tool Co., Cleveland, has been elected to the board of directors.

• **F. C. Crawford**, president of Thompson Products, Inc., Cleveland, and **George A. Martin**, chairman of Sherwin-Williams Co., have been awarded the Cleveland Cham-



James R. White, director of sales of the Clover Mfg. Co., Norwalk, Conn.

ber of Commerce medal for public service during the past year.

- **Joseph Stross** has resigned his position as buyer for the Crosley Corp. with whom he has been associated for 16 years to accept the position of purchasing agent for the Metal Specialty Co., Cincinnati. After serving two years with the American Army in France, Mr. Stross was purchasing agent for the Pollak Steel Co. for 10 years prior to his connection with Crosley.

- **Don A. Luscombe** has been named head of the aircraft parts division of the Louisville, Ky., plant of the Reynolds Metals Co. Mr. Luscombe left the University of Iowa in his second year to join the aviation service of the United States Army. After the war he entered the airplane manufacturing business, being associated with the Waco Aircraft Co. and the Lambert Engineering Corp. and later with the Monocoupe Corp. and the Luscombe Airplane Corp., both of which he organized.

- **H. Oliver West**, former assistant to the president, was elected executive vice-president of the Boeing Airplane Co., Seattle, and its subsidiary, the Boeing Aircraft Co. Mr. West joined the Boeing organization in the post of assistant to the president in November, 1939, after 18 years in the aviation industry. He started with the Boeing company in 1921 and subsequently held the positions of production chief, superintendent of maintenance of Boeing Air Transport, and superintendent of engineering of the United Air Lines. From 1937 to 1939 he was technical adviser in charge of ground organization and maintenance for the Trans-Canada Air Lines.

- **William H. Dunn**, of Raybestos-Manhattan, Inc., Passaic, N. J., was elected treasurer of the Rubber Manufacturers Association.

- **H. E. Smith**, assistant general manager of the Manhattan Rubber Mfg. division of Raybestos-Manhattan, Inc., Passaic, N. J., was elected a member of the board of directors and executive committee of Raybestos-Manhattan, Inc.

- **R. Charles Stiefel, Jr.**, Ellwood City, Pa., **George A. Pugh**, Pittsburgh and **Millard Brainard** of

Cleveland, have been elected new directors of Aetna-Standard Engineering Co., Youngstown.

- **H. H. Zollar** has been named manager of sales of the Shenango-Penn Mold Co., Dover, Ohio. **Clarence R. Hayes**, who has represented the company in the Cleveland sales district for several years, has been placed in charge of the Pittsburgh sales office.

- **William Smila** has been promoted to the post of master mechanic of the Plymouth Motor Corp., Detroit. Mr. Smila was formerly master mechanic at the Chrysler-Jefferson plant, where he started as a tool engineer 15 years ago. In his new Plymouth post, Smila succeeds **Otto W. Franke**, who has been transferred to the Dodge division as general master mechanic.

- **Garland Lufkin**, who has been general manager of the closure and plastics division of Owens-Illinois Glass Co., Toledo, Ohio, has been named general manager of the glass container division. **Smith L. Rairdon**, formerly vice-president and general sales manager of the Owens-Illinois Can Co., will be general sales manager of the glass container division. **Ray R. Washing**, plant manager at Glassboro, N. J., will go to Toledo to become manager of the closure and plastics division, succeeding Mr. Lufkin. **Stanley J. McGiveran**, general manager of Insulux products division, will become vice-president and general sales manager of the can company. **Hugh Paul** will become manager of the Insulux division, and **Edward P. Lockart** will be its sales manager.

- **Russell J. Greenly** has been appointed chief of training, Carnegie-Illinois Steel Corp., Pittsburgh. He has been professor of trade and industrial education at Purdue University for the last five years. Mr. Greenly's varied career in the field of training includes early experience in construction, engineering, maintenance, and reclamation work with du Pont. He was subsequently associated with the New York Shipbuilding Co. in electrical work for a year. In 1923 and for the following four years he served as director of vocational education for the Abington Township

Schools in Pennsylvania. He later was director of teacher and foreman improvement at the University of Akron. From there he went to Purdue University.

- **William A. Streich** has been elected secretary and treasurer, Superior Steel Corp., Pittsburgh, succeeding **N. K. Schaller** who died April 3.

- **John Pathe**, for the past 12 years in charge of the model new car service setup for customer driveaways of the Plymouth Motor Corp., Detroit, has been named chief inspector over all factory inspection work. **A. E. Jones**, formerly chief inspector, takes over new liaison duties between production and the factory's dealer service operations directed by **J. D. McCrimmon**, service chief.

- **Charles J. Stilwell**, president Warner & Swasey Co., Cleveland, has been elected president of the Cleveland Chamber of Commerce succeeding **F. C. Crawford**, president Thompson Products, Inc. **Clifford Hood**, president, American Steel & Wire Co., has been elected vice-president. New directors include **A. W. Steudel**, president, Sherwin-Williams Co., **N. H. Boynton**, manager, General Electric lamp department general sales, and **John Sherwin**, vice-president, Cleveland Trust Co.

- **Clifford S. Stilwell**, executive vice-president, Warner & Swasey Co., Cleveland, has been elected president of the University Club of Cleveland.

- **Morris M. Rose** has been named to the post of general traffic manager of the Milcor Steel Co., Milwaukee, following the recent retirement of **L. R. Conger**, who headed Milcor's traffic department for the past 25 years. **H. J. Hufner** will act as traffic manager for the Eastern district.

- **John Henronymous**, Sheboygan, Wis., has been elected president of the American Hydraulics, Inc., Fond du Lac, Wis., and its divisions, Master Grinder Mfg. Co., Modern Grinder Mfg. Co., and Luther Grinder & Tool Co. **Chester H. Schmidt**, Fond du Lac, and **Harry A. Schauer**, Milwaukee, were made vice-presidents; **Lon L. Grier**, Milwaukee, secretary, and **William A. Schmidt**, Fond du Lac, treasurer.

• **R. W. Jones** has been elected president of the St. Paul Foundry Co., St. Paul, Minn. Other personnel changes include: **R. H. Rowland**, general sales manager; **George E. Cook**, contracting manager; **E. W. Powell**, works manager; **William J. Snyder**, superintendent; **Ralph W. Jones**, chief engineer and secretary; **John H. Gunther**, purchasing agent, and **O. R. Taylor**, treasurer.

• **J. C. Rosemait** has been appointed chief engineer of the Valley Iron Works Co., Appleton, Wis. Mr. Rosemait has had some 29 years experience in design and manufacture and in the heavy machinery industries.

• **Albert J. Proctor**, of the AC Spark Plug division of General Motors Corp., Detroit, was elected president of the Flint Industrial Executives Club succeeding **Leonard W. Johnson**, national manager of parts distribution for General Motors parts division.

• **Sam H. Kehoe** has been appointed manager of the automotive division of the Farnsworth Television & Radio Corp. with offices at 514 Boulevard Building, Detroit. **William H. Myers** has been named automotive radio engineer.

• **Harvey Saul**, for the past two years director of labor of Rhode Island, was named director of the employment relations department of the National Association of Manufacturers and secretary of the associations employment relations committee.

• **Charles E. Brown, Jr.**, former assistant to the president, was elected vice-president of the Okonite Co., Passaic, N. J., and the Okonite-Callender Cable Co., Paterson, N. J. Mr. Brown, who has been associated with the company's sales department since 1925, will remain in charge of the Washington office. **Albert F. Metz**, treasurer of both the Okonite Co. and the Okonite-Callender Cable Co., Inc., was elected a director of the latter organization.

• **J. Preston Edwards**, formerly located at the Kansas City office of the Granite City Steel Co., Granite City, Ill., has been transferred to the company's new office at 2210 Park Street, Houston, Tex., where he will be district manager of sales.

Obituary

• **Harry Wilson, Sr.**, aged 76, an employee for 65 years of the Jessop Steel Co., Washington, Pa., and its one-time parent concern, Jessop of Sheffield, England, died April 4 at his home in Washington, Pa. Mr. Wilson began working for the parent concern in England in 1875 as a screw boy on the sheet mills, and, at the age of 19, became a roller. In 1905 he became night superintendent of the sheet mills in the newly established plant in Washington, Pa. He remained in this capacity until 1938 when he was given less onerous employment.

• **Carl Jarecki**, secretary of the Jarecki Mfg. Co., Erie, Pa., died April 3.

• **Edward Lord Clark**, mechanical engineer, died at Longmeadow, Mass., April 7. Mr. Clark was born in Newton, Mass., 66 years ago; was graduated from Andover Academy in 1894 and from Yale University four years later; and successively worked for Westinghouse Electric & Mfg. Co., Henry R. Kemp Corp., and Cyrus William Rice Co., Pittsburgh.

• **Alexander Glass**, chairman of the board of directors of the Wheeling Steel Corp., Wheeling, W. Va., died recently in Lake Wales, Fla. He was 81 years old. After graduating from Iron City College, Pittsburgh, Mr. Glass was employed as a post office clerk, then became bookkeeper and secretary of the Laughlin Junction Steel Co., Mingo Junction, Ohio. In 1902 he became vice-president of the Portsmouth Steel Co., was made president in 1910, and in 1920 merged it with the Labelle Iron Works, a firm which had been founded by his father, and the Wheeling Steel & Iron Co. to form the Wheeling Steel Corp. At that time he became chairman of the board, a position he held until his death.

• **George H. Danner**, president of the Pittsburgh Piping & Equipment Co., Pittsburgh, died recently in that city. He was 67 years old. First employed as a clerk with the McConway-Torley Co., Mr. Danner

later secured a position with Best-Fox & Co. and the Allegheny Valley Railroad. When the company was incorporated as the Best Mfg. Co., he became a director and secretary. In 1903 he helped found the Pittsburgh Piping & Equipment Co. He remained president and general manager of the company until the time of his death.

• **Edwin H. Marble**, president of Curtis & Marble Machine Co. and Fremont Casting Co., died at his home in Worcester, April 16, aged 87 years. In 1886 he was placed in charge of engineering work and became a vice-president, and in 1910 became president of both companies.

• **John Mueller**, president and founder, in 1901, of the Brookside Brass Foundry & Mfg. Co., Cleveland, died April 14, aged 73 years.

• **Frederick C. Bryan**, for 30 years general traffic manager of the Allis-Chalmers Mfg. Co., died at his home in Milwaukee, April 7. He was born in Raleigh, N. C., 77 years ago. Mr. Bryan was chairman of the transportation committee of the Milwaukee Association of Commerce, chairman of the Machinery Division's Shippers' Advisory Board, and a director of the Associated Traffic Clubs of America. In 1905 Mr. Bryan became vice-president of the St. Paul & Western Coal Co. and of the Boston Coal Dock & Wharf Co. of St. Paul, Minn.

• **Thomas M. Gregory**, vice-president and one of the founders of the Hanlon-Gregory Co., Pittsburgh, died recently in New York.

• **John Spousta**, 60 years old, owner of Advance Castings Co., St. Johns, Mich., died March 21. He purchased the foundry in 1913 and later sold it and repurchased it in 1934.

• **George B. M. Rogers**, secretary-treasurer of the Excelsior Foundry Co., Belleville, Mo., died recently, aged 78 years. From 1916 to 1937, Mr. Rogers was president of the First National Bank of Belleville.

• **S. D. Nance**, sales manager of the basic slag division, Tennessee Coal, Iron & Railroad Co., died April 15 in Birmingham. Mr. Nance, aged 64 years, became associated with the Tennessee company in 1911 as a salesman.

The Iron Age Comparison of Prices

Advances Over Past Week in Heavy Type; Declines in Italics

	Apr. 22, 1941	Apr. 15, 1941	Mar. 25, 1941	Apr. 23, 1940		Apr. 22, 1941	Apr. 15, 1941	Mar. 25, 1941	Apr. 23, 1940
Flat Rolled Steel:					Pig Iron:				
(Cents Per Lb.)					(Per Gross Ton)				
Hot rolled sheets	2.10	2.10	2.10	1.90	No. 2 fdy., Philadelphia..	\$25.84	\$25.84	\$25.84	\$24.84
Cold rolled sheets	3.05	3.05	3.05	2.85	No. 2, Valley furnace....	24.00	24.00	24.00	23.00
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50	No. 2, Southern Cin'ti...	24.06	24.06	24.06	23.06
Hot rolled strip	2.10	2.10	2.10	1.90	No. 2, Birmingham.....	20.38	20.38	20.38	19.38
Cold rolled strip	2.80	2.80	2.80	2.60	No. 2, foundry, Chicago†	24.00	24.00	24.00	23.00
Plates	2.10	2.10	2.10	2.10	Basic, del'd eastern Pa...	25.34	25.34	25.34	24.34
Tin and Terne Plate:					Basic, Valley furnace....	23.50	23.50	23.50	22.50
(Dollars Per Base Box)					Malleable, Chicago†	24.00	24.00	24.00	23.00
Tin plate	\$5.00	\$5.00	\$5.00	\$5.00	Malleable, Valley	24.00	24.00	24.00	23.00
Manufacturing ternes ..	4.30	4.30	4.30	4.30	L. S. charcoal, Chicago..	30.34	30.34	30.34	30.34
Bars and Shapes:					Ferromanganese†	120.00	120.00	120.00	100.00
(Cents Per Lb.)					†The switching charge for delivery to foundries in the Chicago district is 60c. per ton. †For carlots at seaboard.				
Merchant bars	2.15	2.15	2.15	2.15	Scrap:				
Cold finished bars	2.65	2.65	2.65	2.65	(Per Gross Ton)				
Alloy bars	2.70	2.70	2.70	2.70	Heavy melt'g steel, P'gh	\$20.00	\$20.00	\$21.00	\$16.25
Structural shapes	2.10	2.10	2.10	2.10	Heavy melt'g steel, Phila.	18.75	18.75	20.00	16.75
Wire and Wire Products:					Heavy melt'g steel, Ch'go	18.75	18.75	20.00	15.375
(Cents Per Lb.)					Carwheels, Chicago .....	....	....	20.25	17.00
Plain wire	2.60	2.60	2.60	2.60	Carwheels, Philadelphia..	....	....	23.00	20.25
Wire nails	2.55	2.55	2.55	2.55	No. 1 cast, Pittsburgh...	23.25	23.25	23.25	17.75
Rails:					No. 1 cast, Philadelphia..	24.00	24.00	25.75	20.25
(Dollars Per Gross Ton)					No. 1 cast, Ch'go*.....	*22.60	*22.60	21.25	15.75
Heavy rails	\$40.00	\$40.00	\$40.00	\$40.00	*Changed to gross ton basis.				
Light rails	40.00	40.00	40.00	40.00	Coke, Connellsville:				
Semi-Finished Steel:					(Per Net Ton at Oven)				
(Dollars Per Gross Ton)					Furnace coke, prompt...	\$5.625	\$5.625	\$5.625	\$4.00
Rerolling billets	\$34.00	\$34.00	\$34.00	\$34.00	Foundry coke, prompt ..	6.25	6.25	6.25	5.25
Sheet bars	34.00	34.00	34.00	34.00	Non-Ferrous Metals:				
Slabs	34.00	34.00	34.00	34.00	(Cents per Lb. to Large Buyers)				
Forging billets	40.00	40.00	40.00	40.00	Copper, electro., Conn.*..	12.00	12.00	12.00	11.50
Wire Rods and Skelp:					Copper, Lake, New York	12.00	12.00	12.00	11.50
(Cents Per Lb.)					Tin (Straits), New York	52.50	52.125	52.50	47.50
Wire rods	2.00	2.00	2.00	2.00	Zinc, East St. Louis.....	7.25	7.25	7.25	5.75
Skelp (grv'd)	1.90	1.90	1.90	1.90	Lead, St. Louis	5.70	5.70	5.60	4.95
					Antimony (Asiatic), N. Y.	16.50	16.50	16.50	16.50
					*Mine producers only.				

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 133-142 herein. On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

Composite Prices

FINISHED STEEL				PIG IRON				SCRAP STEEL			
April 22, 1941.....	2.261c. a Lb.....	.....	\$23.61 a Gross Ton.....	.....	\$19.17 a Gross Ton.....	.....		.....
One week ago.....	2.261c. a Lb.....	.....	\$23.61 a Gross Ton.....	.....	\$19.17 a Gross Ton.....	.....		.....
One month ago.....	2.261c. a Lb.....	.....	\$23.61 a Gross Ton.....	.....	\$20.33 a Gross Ton.....	.....		.....
One year ago	2.211c. a Lb.....	.....	\$22.61 a Gross Ton.....	.....	\$16.13 a Gross Ton.....	.....		.....
High				High				High			
1941.....											
1940.....	2.261c., Jan. 2	2.211c., Apr. 16		\$23.61, Mar. 20	\$23.45, Jan. 2	\$22.00, Jan. 7	\$19.17, Apr. 10				
1939.....	2.286c., Jan. 3	2.236c., May 16		23.45, Dec. 23	22.61, Jan. 2	21.83, Dec. 30	16.04, Apr. 9				
1938.....	2.512c., May 17	2.211c., Oct. 18		22.61, Sept. 19	20.61, Sept. 12	22.50, Oct. 3	14.08, May 16				
1937.....	2.512c., Mar. 9	2.249c., Jan. 4		23.25, June 21	19.61, July 6	15.00, Nov. 22	11.00, June 7				
1936.....	2.249c., Dec. 28	2.016c., Mar. 10		23.25, Mar. 9	20.25, Feb. 16	21.92, Mar. 30	12.92, Nov. 10				
1935.....	2.062c., Oct. 1	2.056c., Jan. 8		19.74, Nov. 24	18.73, Aug. 11	17.75, Dec. 21	12.67, June 9				
1934.....	2.118c., Apr. 24	1.945c., Jan. 2		18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, Apr. 29				
1933.....	1.953c., Oct. 3	1.792c., May 2		17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25				
1932.....	1.915c., Sept. 6	1.870c., Mar. 15		16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3				
1931.....	1.981c., Jan. 13	1.883c., Dec. 29		14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5				
1930.....	2.192c., Jan. 7	1.962c., Dec. 9		15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29				
1929.....	2.236c., May 28	2.192c., Oct. 29		18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9				
Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products represent 85 per cent of the United States output.				Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.				Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.			

Summary of the Week

STEEL companies probably will make no concerted effort to obtain relief from Price Administrator Henderson's order of April 17 pegging steel prices at the March 31 level. Nor is there any indication that any company will contest the legality of the price ceiling by court action or by openly defying the order.

When the Price Administrator's order was unexpectedly issued last week some of the major steel companies were making studies to determine the price advances necessary to compensate in part for the recent wage increase. It was apparently the intention of the leading producer to absorb half of the wage increase and put moderate price increases into effect that would offset the other half and the increased costs caused by liberalization of vacation allowances.

In any event the suggested price increases would have been submitted to the Office of Price Administration before being announced, but steps that were being taken in that direction were nipped by the order freezing prices.

STUDIES of the effect of the wage increase on costs and earnings are being made by all companies and in due time the results will be presented to the Office of Price Administration with requests for relief. It does not seem likely that a horizontal price increase will be advocated, but that situations which exist in certain products will be the basis for an appeal for permission to make price adjustments.

Before the price order had been issued it had been brought to the attention of the Washington authorities that the companies less favorably situated with respect to costs might be forced to operate at a loss or at sub-normal profits under a condition which would leave the large, well integrated companies with at least moderate profits. The door has been left open by the Price Administrator for proof of any undue hardship that may be caused to any producer and advantage of this offer may be taken quickly by some of the smaller companies. The possibility of a dual system of prices has been discussed, or as an alternative some kind of a government subsidy may be worked out for those which would be immediately forced into an operating loss.

EXPORT business in steel has come to an almost complete standstill as a result of that portion of the order which puts a ceiling also on export prices. As most of the recent sales to countries other than those coming under the provisions of the Lease-Lend law have been at prices above the domestic level, the effect of the order is to reduce export prices. The Price Administration has not clarified its position as to whether all private export business will be governed by the ceiling. Under the circumstances neutral coun-

• Steel price ceiling will result in presentation of cost facts by individual producers to support plea for relief . . . Steel export business at a standstill . . . Pig iron and steel output curtailed by coke shortage.

tries may find it more difficult than ever to buy steel here.

Pig iron prices were not included in the steel order, but action may still be taken to freeze these.

Meanwhile, government control of iron and steel scrap prices, which has been in effect for three weeks, is not working smoothly. A particular hardship is being caused to foundries.

Greatly complicating its other problems is the loss of production of coke, pig iron and steel by the steel industry as a result of the continuance of the bituminous coal strike. Whether the miners go back to work this week or not, further production losses are inevitable as it will take some time to get back to the 100 per cent operation that prevailed in March. Ten or more blast furnaces have been banked or blown out while others are operating on reduced blast. The loss of pig iron has brought curtailment of steel making. The industry rate is down two and a half points this week to 96 per cent, which compared with the 100 per cent rate of March means a loss this week of more than 54,000 tons of ingots and about 38,000 tons of finished steel at a time when every ton of steel is urgently needed. There was a loss of six points to 96 per cent in the Chicago district and one of four points to 95 per cent at Pittsburgh. A major producer has lost about 10 points in its operating rate in the past two weeks and may be forced still lower next week.

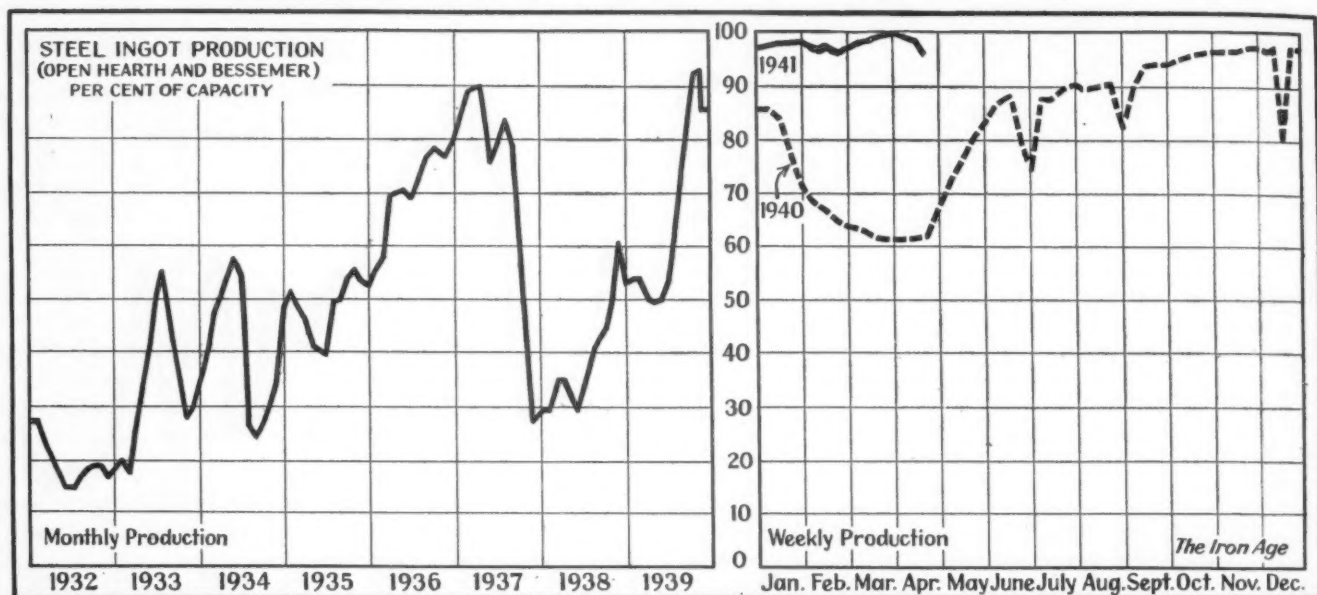
AN effect of the curtailment of steel production is to increase unfilled tonnage at the mills. A further increase is occurring because of the continued receipt of new business in a volume exceeding shipments. Foundries may face a shortage of pig iron as a result of loss of blast furnace output. Continuous sheet mills, forced to roll ship plates, will have a smaller output of sheets and strip. With the award of 184 additional ships, plate requirements will increase. Tin plate business is expanding rapidly which forces an additional burden on these mills.

The Industrial Pace . . .

FURTHER REDUCTION in industrial production at Pittsburgh, a decline of a half point in the steel production rate, and a considerable drop in heavy engineering construction awards caused further recession in THE IRON AGE index of capital goods activity to 103.7 from 107.7 the preceding week. Slightly improved automobile output, recovering to 99,945 from 99,260 units the week before, was offset by the rise of the seasonal adjustment factor to account for the week of annual peak production. Lumber carloadings recovered somewhat.

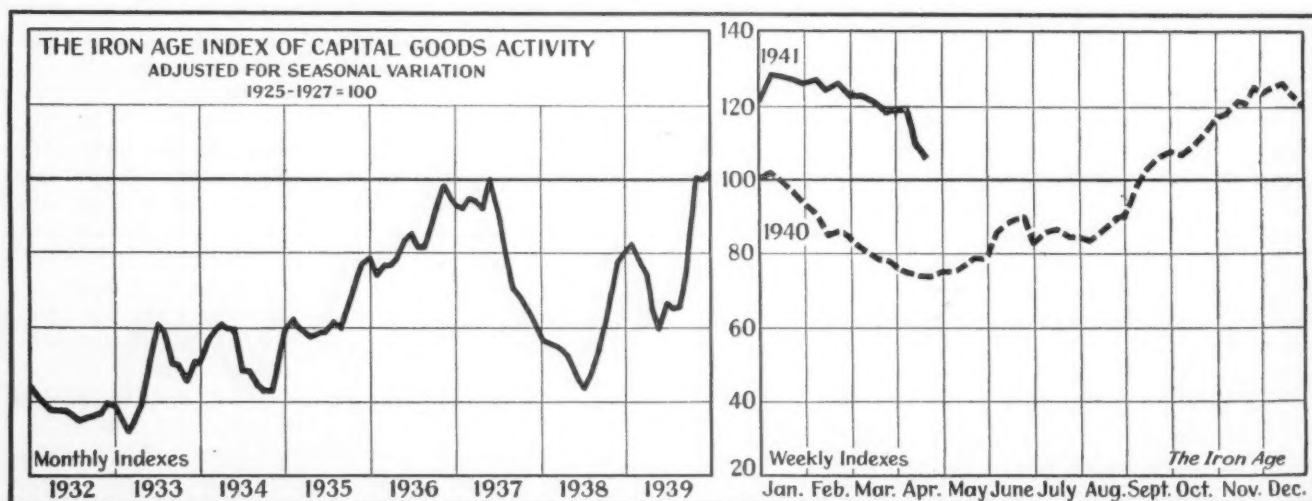
DOMESTIC DELIVERIES of refined copper, needed in huge quantities for the defense program, in March rose to 134,333 net tons, 19 per cent higher than the 112,808 tons shipped in February, and 109 per cent higher than in March, 1940. On the basis of official maximum prices for iron and steel scrap, THE IRON AGE scrap composite is now \$19.17, compared with an average price in 1940 of \$18.67, in 1937 of \$18.03 and in 1929 of \$16.25. Petroleum output expanded in February, averaging 3,773,000 bbl. daily, as compared with 3,737,000 bbl. in January, and 3,899,000 bbl. in February, 1940.

Coal Strike Lowers Production 2½ Points to 96%



District Ingot Production, Per Cent of Capacity		Pittsburgh	Chicago	Valleys	Philadelphia	Cleveland	Buffalo	Wheeling	Detroit	Southern	S. Ohio	Western	St. Louis	Eastern	Aggregate
Current Week	..	95.0	96.0	99.0	96.0	97.0	104.5	85.0	97.5	95.0	103.5	102.5	111.0	95.5	96.0
Previous Week	..	99.0	102.0	99.0	96.0	98.0	106.0	85.0	85.0	95.0	109.0	102.5	111.0	95.5	98.5

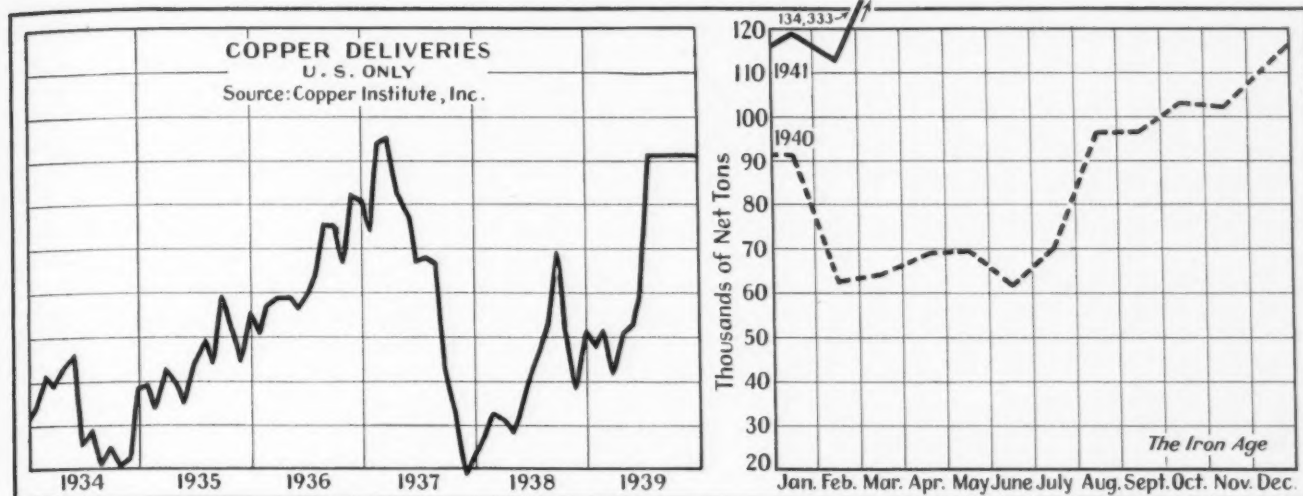
Capital Goods Index Continues to Decline



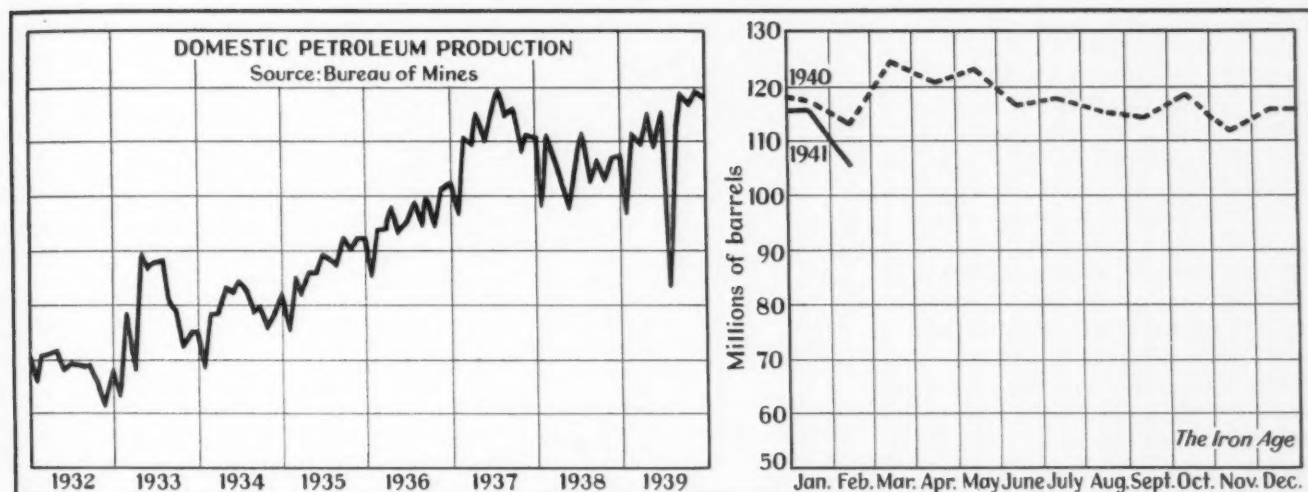
Component	Week Ended	Apr. 19	Apr. 12	Mar. 22	Apr. 20 1940	Apr. 20 1929
Steel ingot production ¹	130.8	131.5	130.8	79.8	126.3
Automobile production ²	81.0	83.2	114.0	84.1	127.2
Construction contracts ³	141.2	147.5	151.3	67.8	134.8
Forest products carloadings ⁴	69.9	69.2	71.9	55.4	125.4
Pittsburgh output and shipments ⁵	95.7	106.9	126.2	83.8	123.3
COMBINED INDEX	103.7	107.7	118.8	74.2	127.4

Sources: ¹THE IRON AGE; ²Ward's Automotive Reports; ³Engineering News-Record; ⁴Association of American Railroads; ⁵University of Pittsburgh. Indexes of forest products carloadings and activity in Pittsburgh area reflect conditions as of week ended April 12. Other indexes cover week of April 19.

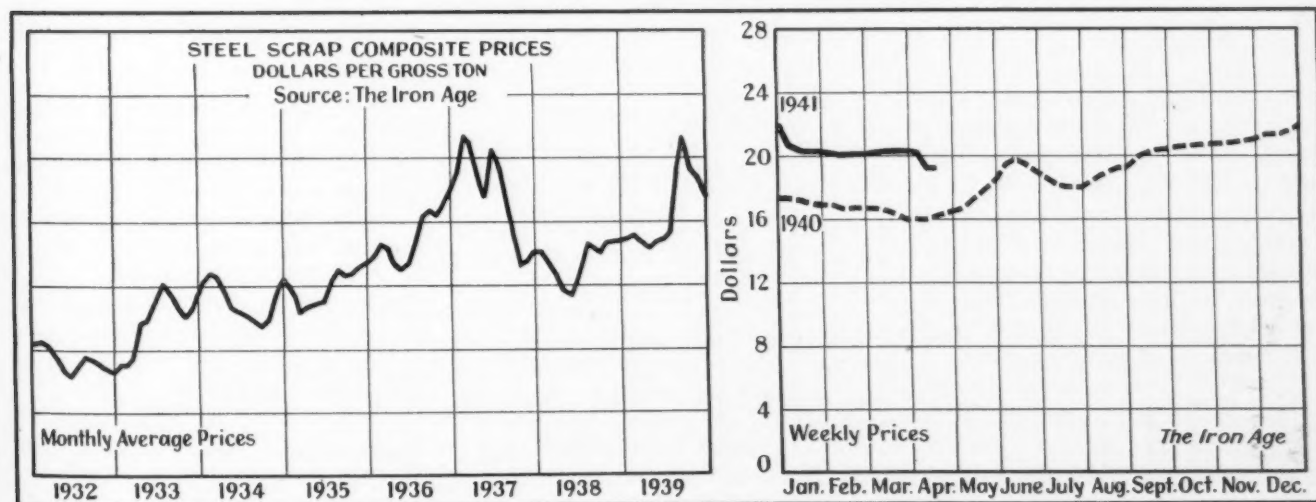
Copper Deliveries Increase 19% in March



Rate of February Oil Output Down Slightly



Steel Scrap Composite Fixed at \$19.17



Market News

...THE WEEK'S ACTIVITIES IN IRON AND STEEL

New Business

... Coal strike and price situation cause unsettlement

With the coal strike hampering pig iron output and beginning to drag down steel production and with the question of a steel price advance badly in need of clarification, the outlook for the steel industry is unsettled.

Eventually necessary relief in the form of moderate price advances will be permitted those departments suffering most seriously as the result of rising costs, it is believed at CLEVELAND. Meanwhile, all shipments are being billed at the first quarter price basis. A price advance or lack of a price advance will not change the new business picture, which continues bright. During the past week incoming tonnage has been heavy and mills have fallen farther behind on deliveries, particularly in plates, structural steel and railroad materials.

PITTSBURGH steel makers experienced no slowing up in the volume of fresh orders the past week. Business so far this month is running from 5 to 15 per cent ahead of last month, a banner period. The drop in ingot rate at PITTSBURGH, due to the coal strike, serves to further complicate an already intricate delivery and backlog picture.

The percentage of direct defense business in CHICAGO'S steel plants is mounting daily, is extremely high, estimated by some to be over 80 per cent. Influx of new Navy orders calling for ship plates will force mills to again reschedule deliveries in an already extremely tight product. Though some mills there reported less new business last week, the decline was very slight, and orders were well ahead of shipments. Major producer there is now taking orders for 1942, subject to prices and delivery conditions in effect at that time. Coal strike has materially lowered that district's operating rate, will send it lower if situation does not change.

BIRMINGHAM steel mills report that orders are keeping pace with the record month of March. Production has yet to be affected by the idleness in Alabama's strike-bound coal mines.

Plates, sheets, bars and other products going into defense materials are being booked in undiminished volume in eastern Pennsylvania, but miscellaneous tonnage has fallen off. Many sizes of bars, hot rolled sheets and plates are not available for shipment this year.

Difficulty in obtaining inter-coastal cargo space is becoming more and more evident. All-rail shipments to the Pacific Coast have increased tremendously, particularly on defense projects. Much steel plate tonnage for shipbuilding has been moved by rail.

Iron Ore

... Higher wages and vessel rates add to costs

Developments in the iron ore market during the past week included:

Decision to reaffirm for the 1941 season base prices on Lake Superior ore which prevailed during 1940. This necessitated the writing down of some contracts which had been tentatively established and the filling in of other contracts which had been held open.

The raising of vessel transportation costs on iron ore and coal shipped on the Great Lakes during the current season. The schedule of new vessel rates on the Great Lakes, in cents per ton, follows:

	1941	1940
Head of lakes to lower lake ports	77c	70c
Marquette to lower lake ports	69½c	63c
Escanaba to lower lake ports	58c	52½c
Escanaba to Chicago District	46c	42c
Vessel Coal Rates:		
Lake Erie to head of Lake Superior	44c	40c
Lake Erie to Lake Michigan north of Milwaukee	49½c	45c
Lake Erie to Milwaukee and Chicago District	55c	50c

The granting to ore miners of the 10c. per hr. wage increase given steel workers. In addition to this wage boost, ore mining companies are now computing working time from the collar of the mine until the employee returns to the collar

of the mine at the end of the working period, which means higher costs. Lake sailors were granted wage increases at the start of the navigation season.

Estimate by C. C. Lindeman, statistician for M. A. Hanna Co., Cleveland, that on April 17 the American ore fleet on the Great Lakes was 96 per cent in commission, an unusual record of activity, leading to expectation that more than 5,000,000 tons of ore would be brought to lower Lake ports during April. Only 11 ore carriers were idle, most of them held back by the necessity for repairs, the delay in some cases due to inability to obtain quick delivery of parts and materials.

Announcement by the Lake Superior Iron Ore Association that Lake Superior ore consumed by blast furnaces and open hearths during the month of March set a new all-time record at 6,411,531 gross tons, contrasted with the previous record set in January at 6,331,018 tons. Cumulative total of consumption for the year 1941 to April 1 was 18,415,715 tons against 13,618,914 tons to April 1, 1940.

Ore on hand at furnaces and Lake Erie docks April 1 totaled 17,760,742 tons against 21,862,302 tons on the same date of 1940. There were 168 stacks dependent principally on Lake Superior ore active March 31 and 18 idle.

Pig Iron

... Acute shortage is being felt as result of coal strike

Whether the coal strike is settled this week or not, an acute shortage of pig iron both for steel making and foundry use is now inevitable. If the miners do not go back to work this week, there will be further curtailment next week. With both steel and pig iron consumption at maximum levels, the loss of production now occurring cannot be made up.

At the moment of writing the blast furnaces that have been blown out or banked as a result of coke shortage are as follows: Carnegie-

Illinois Steel Corp., three in Pittsburgh district, one at Mingo Junction plant, one in the Youngstown district, two in Chicago district. Others may possibly be banked before this issue of THE IRON AGE has gone to press. The Shenango furnace in the Valley has been banked and also the Sharpsville furnace, which the Shenango Furnace Co. is operating. The Sharon Steel Corp. has banked a furnace at Lowellville, Ohio.

Cleveland stacks of the U. S. Steel Corp. and Republic Steel Corp. are on low wind and some face the prospect of being banked soon owing to dwindling coke supplies. One merchant stack of Republic at Cleveland was banked last week.

Up to this week most of the curtailment of coke production had occurred at beehive ovens, but by-product ovens are now being affected. Of four batteries of coke ovens at the Joliet, Ill., plant of Carnegie-Illinois, three are down.

The effect of the coal strike on beehive coke production is shown by the weekly report of the U. S. Bureau of Mines for the week ended April 12, when total beehive production was 7000 net tons, a decline of 90.6 per cent from the 74,600 tons produced in the week ended April 5. The Pennsylvania output was 5400 tons in that week compared with 68,000 tons in the week before.

Steel production, already affected by the shortage of coke and pig iron, will be more seriously affected next week, and even after the strike is settled some time will elapse before blast furnace operations get back to where they were. It is possible that some foundries will have to curtail operations later on because of delayed pig iron shipments.

Pig iron prices were not included in the order of Price Administrator Henderson fixing a ceiling on steel prices, but advices from Washington are that such action may be taken later. A pig iron producer estimates that 50c. a ton has been added to the cost of making pig iron by the wage increase.

Not because of coke shortage but for a repairs, a blast furnace of the Alan Wood Steel Co. at Swedeland, Pa., has been blown out. Three furnaces of the Woodward Iron Co. at Birmingham are back in blast after a shutdown caused by an explosion.

Prices

Henderson's order and Weir's statement may forestall any immediate advances

The position taken by E. T. Weir, board chairman, National Steel Corp., that the steel industry should first determine the actual facts with relation to the wage and coal increases in the second quarter before determining a price policy, appeared to indicate that no attempt will be made to change steel prices during the rest of this quarter. Any action on this matter will probably not be taken until complete sales and production data on second quarter experience are available.

"No one in the steel industry or government can estimate today whether the industry can or can't get along without a price advance," said Mr. Weir. "No one knows where the industry stands and what it needs. There are no facts available and opinions expressed so far are conjectures." He advocated that the industry go through the entire second quarter and said that by the middle of July the facts would speak for themselves as to whether price compensation was needed by the industry, by companies, or for certain products.

"This action will give Mr. Henderson the facts and I assume any action Mr. Henderson's office takes will be based on actual facts," said Mr. Weir. The steel leader, who led the parade two weeks ago in announcing a 10c. per hr. increase in wages, said he assumed there was no disposition on the part of the government to see the steel industry operate without profit. Nor was there any disposition to see any company put out of business.

On the subject of wages, Mr. Weir pointed out that steel workers have had no increase in rates for the past four years and, with increased earnings in the steel industry, they were entitled to share some of the profits.

Commenting on the cost to the steel industry of the steel and coal wage increases, Mr. Weir said some of the figures were fantastic but he estimated that on an annual basis it would approximate \$135,000,000.

He added further that an important intangible factor in a wage increase was the increased efficiency of the employees following such a move and indicated that such an increase in efficiency was already discernible in his own mills.

Mr. Weir's plea for a trial period before making any recommendations leading to a change in the steel price structure, substantially coincides with the statement released from Washington last week by Leon Henderson, new price administrator. Major differences in the two points of view appear to be only the matter of timing, in that Mr. Weir suggests cost studies be definitely made as soon after the close of the second quarter as possible.

That some of the small and medium size companies are in a more dangerous position with respect to profits than are the large, well integrated companies is indicated by the statement issued by E. J. Kulas, president, Otis Steel Co., Cleveland, who said that his company is facing the prospect of operating at a loss or at a drastically sub-normal profit. He cited that the wage increase will cost his company \$1,200,000 a year whereas last year its profits were only \$700,000. "The Henderson action," he said, "is a threat to the defense program because steel companies cannot maintain efficiency of operation without a profit, and efficiency is the essence of the defense program. With loss or sub-normal profits steel companies cannot borrow capital or accumulate surpluses needed to repair and expand plants in step with the rapidly increasing requirements of national defense."

Declaring his sympathy with the effort to prevent inflation of prices, Mr. Kulas said that "Henderson's action in removing the ceiling from coal prices the very day he clamped a ceiling on steel prices was discriminatory. Many of the steel companies have been caught in a squeeze play and some prompt action is necessary to extricate them."

Reaction at Washington to the Henderson order pegging steel prices included the intimation by the Navy Department that the new Office of Price Administra-

tion and Civilian Supply will not stand in the way of higher steel prices for certain items, and the criticism from Capitol Hill that Mr. Henderson's price fixing orders are "absolutely illegal."

Appearing before the Senate Defense investigating committee, Secretary of the Navy Frank L. Knox turned down a suggestion by Senator Robert O. Brewster, committee member, that such or-

ders as the steel price order may decidedly affect the cooperative attitude of industry.

"What I suspect Mr. Henderson is attempting to do," Secretary Knox told the committee, "is to find time to analyze steel prices and see what kinds of steel may properly be advanced in price and what types of steel products are not affected."

The Navy spokesman said he

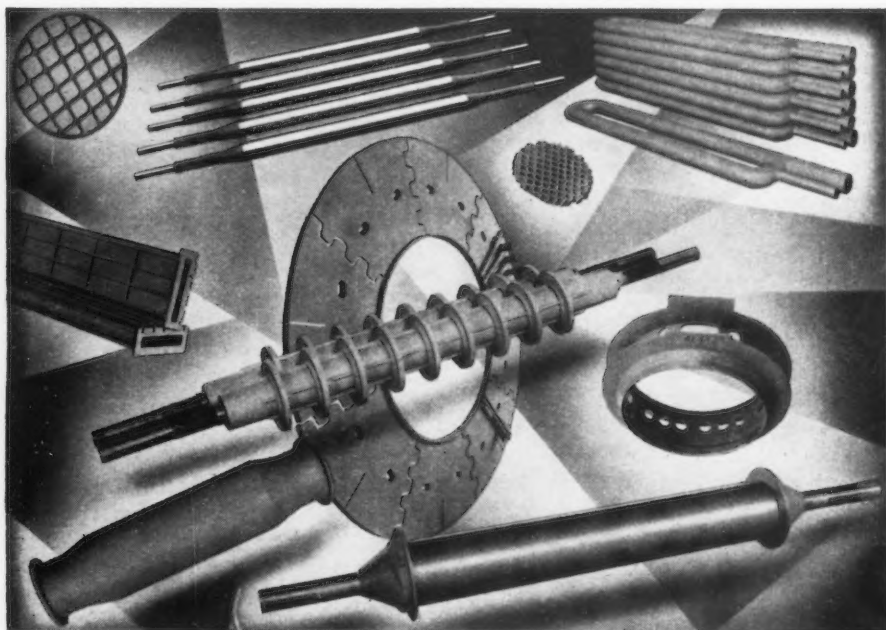
saw no difficulty ahead because of the Henderson steel order "if the problem is approached on a reasonable basis."

In the Senate, the price order was bitterly attacked as a "usurpation of authority which lies only in Congress." Said Senator Robert A. Taft, Republican of Ohio: "In particular, I think Mr. Henderson's price-fixing orders are absolutely illegal, and represent a usurpation of the authority which only Congress may exercise. I do not know whether or not Senators have read those orders, but they read like laws. They purport to lay down rules of law for the violation of which persons are to be punished."

The Senator conceded that price-fixing power ought to be granted to some "proper authority" but insisted that Mr. Henderson's method is not the proper way to fix prices. He forecast that the orders will turn out to be ineffective because there will be "some who will not obey—some not caring about public opinion."

Export prices present one of the serious complications. The paragraph in the Henderson announcement relating to exports reads as follows: "Where iron or steel products sold or delivered for export are not available in sufficient quantity at or near the governing basing point as defined in this price schedule, a person producing such products at a place other than the governing basing point may designate the basing point at or nearest its place of production as the governing export basing point, and on such products sold or delivered for export the ceiling price shall be the sum of these elements: 1. The basing point base price applicable to the governing export basing point; 2. extras; 3. transportation charges from the governing basing point to the place of delivery as customarily computed, but in no event in excess of the lowest published common carrier freight rate from the governing export basing point to the place of delivery, including such switching charge as may be applicable."

Most of the export sales recently, other than to Britain, Canada and other countries being aided by the United States, have commanded prices above the domestic level.



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Steel Operations

... Production rate declines to 96 per cent because of coke shortage

The coal strike having curtailed coke production, blast furnaces have been forced to bank or blow out and this has resulted in a further decline this week in ingot production to 96 per cent from 98.5 per cent last week. A further decline is in prospect next week whether coal miners go back to work this week or not.

Compared with the 100 per cent ingot output in March, this week's output will show a loss of more than 54,000 tons of ingots and more than 38,000 tons of finished steel at a time when requirements are mounting rapidly and consumers' stocks are being steadily reduced.

Carnegie-Illinois Steel Corp., which depends on beehive coke for its blast furnaces to a greater extent than other large steel producers, has lost about 10 points in its steel operating rate in the past two weeks.

CHICAGO has suffered a decline of six points to 96 per cent and PITTSBURGH is off four points to 95 per cent. The loss at CLEVELAND is one point while at BUFFALO there has been a decline of one and a half points. The only gain is at DETROIT, where resumption by Ford Motor Co. has brought the district rate up 12.5 points to 97.5 per cent.

Railroad Buying

... Orders light, consisting of 130 cars, 12 engines

Purchases of railroad material this week amounted only to 130 cars, 12 locomotives and 9000 tons of rails.

Baltimore & Ohio bought four 4000-hp. diesel-electric locomotives for passenger service from the Electro-Motive Corp. and 23 70-ton gondolas from the Bethlehem Steel Co.

Illinois Central, in addition to its large order of 2300 freight cars reported in THE IRON AGE last week, took 100 50-ton flat cars from American Car & Foundry Co.

United States Navy has placed six 70-ton flat cars with Haffner-

Thrall Car Co. and one with Greenville Steel Car Co.

Electro-Motive Corp. is building two 600-hp. diesel-electric switchers for Detroit, Toledo & Ironton and two for Great Lakes Steel Corp.

Minnesota Transfer ordered three diesel-electric switching locomotives from American Locomotive Co.

Atlantic Coast Line bought 8500 tons of rails from Tennessee Coal, Iron & Railroad Co., Rutland 500 tons from Bethlehem.

Norfolk & Western is inquiring for 700 to 1500 box cars of 50-ton capacity.

Heavy awards for axles, wheels and other auxiliary car parts have been coming out from leading railroads in recent weeks following in the wake of large scale car buying.

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Shipbuilding

... Contracts awarded for 184 ships to cost \$364,800,000

Eight companies have been awarded contracts totaling \$364,800,000 for the construction of 184 ships to be turned over to Britain by the Maritime Commission under the lease-lend act. Of the 184 vessels, 112 will be the emergency type of "ugly duckling" ships while 72 will follow the commission-designed tankers of 16,000 deadweight tons. Approximately 775,000 tons of steel will be required for the 184 vessels, which are to be completed within a two-year period.

Companies receiving the awards follow:

Sun Shipbuilding & Dry Dock Co., Chester, Pa., 72 tankers, \$180,000,000; South Portland (Me.) Shipbuilding Corp., 16 ships, \$26,400,000; Bethlehem-Fairfield Shipyard, Baltimore, 12 ships, \$19,800,000; North Carolina Shipbuilding Co., Wilmington, N. C., 12 ships, \$19,800,000; Houston (Tex.) Shipbuilding Corp., 12 ships, \$19,800,000; California Shipbuilding Corp., Los Angeles, 24 ships, \$39,600,000; Richmond (Cal.) Shipbuilding Corp., 24 ships, \$39,600,000; Oregon Shipbuilding Corp., Portland, 12 ships, \$19,800,000.

Six mine sweepers will be built at Manitowoc, Wis., by Burger Boat Co. Contracts have been placed for piling, docking and construction for four berths at its shipyards. Mine sweepers will cost about \$2,000,000 each, will have two diesel engines of 600 hp. each, and will be 136 ft. long and 25 ft. wide.

A new shipbuilding company organized at Houston, Tex., by H. E. Cockburn, independent oil operator, will be a subsidiary of Spedden Shipbuilding Co., Baltimore. Plans call for construction of a plant on 200-acre site located on the Houston ship channel.

Sheets and Strip

... Heavy flow of specifications continues

Even though steel companies are making no definite promises on shipments except to designate the quarter, the heavy influx of specifications at PITTSBURGH continues. Emphasis at present is on shipment of material now on books,

with the automotive industry still exerting tremendous pressure. The effect of the voluntary curtailment of 1942 car models will not be felt in the sheet market for some time and when it is, it will only serve to slightly alleviate a tight situation.

Costs on cold finished sheets and strip and coated sheets will be up more sharply than other flat rolled items as a result of the recent blanket wage advance at 10c. per hr., according to CLEVELAND producers.

The auto industry continues to reserve space liberally. The limiting of yearly automotive output might not help steel mills to any great extent, it is pointed out. Putting a definite limit on monthly assemblies would be far more beneficial.

Deliveries on sheets at CHICAGO's biggest producer are now in the first quarter of 1942. Automotive demands are still very heavy. Wide strip has also moved back a month in delivery.

Some mills which have been shipping cold rolled sheets against orders for hot rolled pickled and annealed are revising the orders so that material will be billed at the cold rolled sheet prices instead of at hot rolled annealed and pickled sheet prices, which means a higher return of \$2 or more a ton.

Tin Plate

... Heavy demand continues ... Cold mills at capacity

Cold reduction tin plate mills continue this week at virtual capacity and it is reasonable to expect no change in this rate for months to come. Export requirements are heavy but domestic needs keep multiplying.

Plates

... Mill costs up \$2 a ton on wage increase

High speed strip mills at PITTSBURGH are increasing their output of ship plates, with every indication that this tonnage will become progressively larger within the next few months. National Steel Corp. is spending \$3,500,000 to enable its Great Lakes wide strip mill at Detroit to turn out ship plate up to 1 in. thick. Work will be completed by the end of this year.

On the average, plate mill costs are up probably \$2 per ton due to the recent labor wage rise and other advances, reports CLEVELAND. Largest new project at CLEVELAND is approximately 2000 tons for oil barges. Earliest delivery promise on this project is 20 weeks.

Armor plate mills of Republic Steel Corp. are now producing 3500 tons a month of flat plates for fabricators.

Reinforcing Steel

... Awards are 14,710 tons, new projects 6420 tons

Reinforcing steel awards declined to 14,710 tons from 25,800 tons last week.

New reinforcing steel projects of 6420 tons include 1800 tons for the Lincoln Court housing project at Cincinnati.

Merchant Bars

... Specifications flow in an unending stream

An unending stream of bar specifications continues to flow into PITTSBURGH steel makers. Deliveries are considerably extended and material slated for national defense is showing an increasingly larger proportion of the total. Curtailment of 1942 model car production by 20 per cent is not expected to be reflected for some time in bar production and shipments.

Tubular Goods

... Wage increase will greatly affect some items

The effect of the recent wage advance will be drastic on the profits of certain tubular production units, according to CLEVELAND and YOUNGSTOWN makers. Heavy labor costs are particularly noticeable in upset pipe and galvanized merchant items. On the average, tubular goods costs will be higher than in some other divisions of the steel industry.

Miscellaneous line pipe demand still leads tubular requirements at PITTSBURGH with standard pipe orders a close second. Oil country goods requirements are steady but some sources look for a quickening in this market by mid-summer.

Non-Ferrous Metals

... MARKET ACTIVITIES AND PRICE TRENDS

New York, April 22—Only new development in major non-ferrous markets in the past week was an announcement increasing the amount of zinc output to be set aside in May as a reservoir for defense needs. Further action on copper price ceilings awaits the receipt of additional information by the Government. Prices in all markets remained unchanged except tin, which advanced slightly during the week. Transactions were generally in as good or better volume than a week ago. Copper and Zinc producers continued efforts to meet as much demand as possible, while lead buyers were very active.

Major copper producers sold good tonnages in the past week on the usual basis of 12c. a lb., delivered Connecticut Valley. Sales so far this month total about 63,000 tons, as compared with 48,000 tons in the corresponding period of March. Activity in the custom smelter field was slow with prompt and nearby metal limited at 12.50c. Export copper was quoted at 11c. a lb., f.a.s.

Tin

A very fair volume of business was done in the market during the past week with prices gradually rising through the period. Demand was unusually heavy at the end of the week when consumers showed an active interest in metal for May delivery. The current week opened rather slowly, although prompt Straits metal advanced 1/4c. to 52.50c. a lb., delivered New York and showed no weakening tendencies. The fact that very little Straits metal is available for nearby delivery was brought out during the week when it was learned that the 250 tons of tin contracted for by the Navy department will be composed entirely of other grades. Transactions for May delivery were made at 52c. to 52.25c.

Zinc

Coming as no surprise to the trade was the announcement in the past week by the Division of Priorities of the Office of Production Management that producers would be instructed to set aside 17 per cent of their March production in May for use as an emergency pool for defense purposes, a substantial increase from the 5 per cent of January output reserved during the current month. The order will reduce still further the already limited amount of metal available to those consumers without high priority ratings, although of course the total amount available for all consumers will not be decreased. Sales in the past week increased to 5811 tons, while shipments were off to 4445 tons, leaving backlogs at 94,398 tons.

Lead

Consuming demand continues in very good volume from week to week, although generally fluctuating in quantity on different days and between producers. Business in the past week was easily on a par with that of the previous week and waiting lists were generally in evidence throughout the period. Consumption is now running around 65,000 tons a month, while domestic production is averaging about 50,000 tons, the difference being made up by the bringing in of from 15,000 to 20,000 tons of foreign metal, of which ample supplies exist. Buyers' April requirements remain theoretically 100 per cent filled and May is 70 per cent covered. Prices are unchanged at 5.85c. a lb., New York.

(Non-ferrous prices on page 137.)



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Backlogs Still Climb

Cincinnati

• • • Bookings of district machine tool manufacturers show a moderate uptrend during the past week. Of course, this is only relative, since new business is still holding a slight edge over shipments. Builders generally anticipate further increase in demand, as the government defense program becomes more intense. At the present time, new business merely serves to increase backlogs, since all plants in the area are sold out for this year, and many well into 1942. Expanded plant facilities are being pressed to completion with as much rapidity as is humanly possible, and at the same time all means of increasing current output are being expended.

Buying for DPC Account Gaining

New York

• • • More and more buying is taking place for the account of the Defense Plant Corp., indicating that most defense contractors prefer to let this RFC agency take direct title to machinery rather than to try to finance expansions and new plants privately and take a five-year write-off. Practically all machine tool activity is in connection with direct defense work here. Wright Aeronautical is quiet for the present, but Pratt & Whitney is buying against a new program, and all the aircraft and ship instrument makers are actively in the market. A bomb sight manufacturer here in the city is repeating the volume of purchases made last fall, this time for a plant in the Middle West.

Deliveries quoted are for September and on, with some of the larger machines not available until 1942. Small tools, cutters and gages are almost as long in many instances. New orders continue to exceed current shipments for one dealer by as much as two to one, but shipments are steadily climbing. In some instances betterments in the original delivery

promises have been as much as three to five weeks. Building construction has been behind machine deliveries, necessitating the storage of some equipment outside under tarpaulin.

Shipments Climbing Fast

Cleveland

• • • Shipments for the industry as a whole are climbing fast, according to indications here. March apparently showed a large gain over February and beyond a doubt April will see a new peak, perhaps reaching the \$65,000,000 level which it will be necessary to maintain over the balance of this year in order to achieve the 1941 goal of \$750,000,000. From all indications, producers all over the country are out to break all previous records, spurred by the knowledge that a flood of buying under the lease-lend set-up will break very soon.

In the local market new business has been brisk, but lacking any spectacular flair during the past week. Ford Motor Co. accounted for a good portion of sales with heavy purchases of lathes. Local used machinery dealers held an important meeting here April 14 with a Washington official at which many problems connected with resale prices were laid before him.

Deliveries Continue to Lag

Chicago

• • • Despite increased production and continued expansion of manufacturing facilities, complaints of machine tool shortages are still heard in this area. One major contractor for machining fuse bodies from bar stock asserts that the job can only be done profitably on eight spindle automatic screw machines, of which there is a shortage not only in existing machinery, but of the number in production. This source contends that this year's scheduled production will not be enough to meet current needs.

Numerous defense contracts in this area have been re-scheduled frequently, deliveries being moved

back anywhere from one to four months waiting for tools. However, production of machine tools is steadily up, but orders are still ahead of shipments.

Used machinery dealers have long ago moved their best equipment, and are concentrating on digging out scattered machines anywhere. The "ceiling" price schedules affecting second-hand machines is working out with reasonable satisfaction.

Machine Tool Dealers Plan Washington Meeting

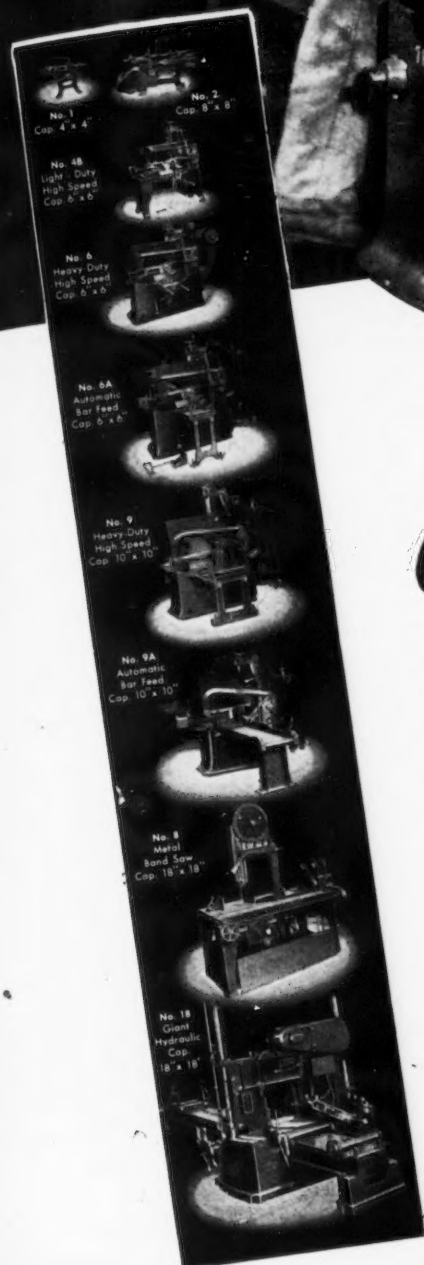
• • • A one-day affair this year, the spring meeting of the Associated Machine Tool Dealers of America will be held in Washington, April 28, at the Mayflower Hotel. In the morning an executive session will be held, followed by a luncheon meeting at which A. G. Bryant, president, Bryant Machinery & Engineering Co., will give a talk entitled, "Let the Chips Fly," and Wendell E. Whipp, president, Monarch Machine Tool Co., will discuss present and future problems. Mason Britton, director, tools section, OPM, will talk at the executive session.

Tell Berna, general manager of the National Machine Tool Builders Association will make the opening remarks at the afternoon session. Then L. B. Gillie, E. I. du Pont de Nemours & Co., will discuss "Scope of Plastics and Attendant Machinery Problems," and Phillip M. McKenna, president, McKenna Metals Co., will talk on "Machining Defense Armaments." F. B. Scott, Jr., Syracuse Supply Co., and president of the association, will preside at all three sessions.

Borg-Warner Builds New Coil Spring Plant

Chicago

• • • Borg-Warner Corp. has started work on a new plant here to be used for manufacture of coil springs for automotive and airplane interests. Plant will be one-story with a two-floor office section.



A great time saver!
for the Sidney Machine Tool Co.

After 6 months of continuous high speed cutting-off (from S.A.E. 4150 bars heat treated to 28 Rockwell, S.A.E. 4150 annealed, and S.A.E. 1335), Mr. L. S. Kirby, Superintendent of the Sidney Machine Tool Co., Sidney, Ohio, reports that his new MARVEL 9A has "given completely satisfactory service and proven to be highly efficient and a great time saver."

Much faster than any other accurate method of cutting off bar steel, these many-duty, all-ball-bearing MARVEL Production Saws are eliminating "bottle necks" in stock rooms and cutting-off departments everywhere. Requiring no more attention than an automatic screw machine, they will cut identical lengths or slices from single or nested bars "automatically" . . . feed, measure, cut-off and stop at any predetermined point.

No matter what your metal sawing problems, the MARVEL System of Metal Sawing supplies the best answer. The local MARVEL Metal Cutting engineer will, upon request, study your requirement, and make recommendation as to methods and equipment.

ARMSTRONG-BLUM MANUFACTURING CO.
"The Hack Saw People"

5700 Bloomingdale Ave.

Eastern Warehouse and Sales: 199 Lafayette St., New York, N. Y.

Chicago, U. S. A.

MARVEL SAWS

Scrap

... MARKET ACTIVITIES AND QUOTATION TRENDS

• • • The Institute of Scrap Iron and Steel held a meeting of its officers and directors at Cleveland on Monday and Tuesday of this week to discuss recommendations that are to be made to the Office of Price Administration and Civilian Supply later in the week for modifications of the government's price schedule.

No announcement of the results of the Cleveland meeting was given out, but it was apparent from the comments of those who attended that it was difficult to arrive at recommendations to which all would subscribe. The reason for this is that there are inequalities in the schedule which work for or against certain districts.

On open hearth grades many districts claimed to be facing serious obstacles, including New England, Birmingham, Southern Ohio, St. Louis and Youngstown. The cast iron scrap price situation, which places some foundries at a disadvantage, seemed difficult to iron out. Discussion also covered ways and means of increasing the flow of scrap, it being the opinion that the price schedule has set up artificial barriers which will be difficult to overcome.

As an example of the disparities between districts it is pointed out that a New England steel plant can pay no more than \$15.50 for No. 1 heavy melting steel, yet a Buffalo mill can pay about \$17 at Bridgeport and barge the scrap to Buffalo and still come within the \$19.25 ceiling at that point. Much of the confusion regarding scrap prices results from the freight rate situation.

THE IRON AGE scrap composite is unchanged at \$19.17.

Chicago

Questions on buying and selling procedure still pile in, indicating doubt in the minds of most everyone on many points. One consumer asked if he could pay more than the maximum price for a special analysis of cast iron borings. Most of the trade thinks it can be done, but all advised waiting until the question had been answered by authorities. One railroad withdrew its list this week after

taking bids to make sure it would be in line. Other roads here still refuse to issue lists. Buying is difficult and not much is expected until after May 10. Selling is at government prices. Two mills came in this week with large orders at the fixed ceilings. No new prices on any item, including those not listed in the first government announcement, have come out here.

Pittsburgh

While the market is slightly cleared, activity still is largely in shipment of old orders. Some consumers insist material is not coming out as fast as needed and the consensus is that transactions at the new prices will be scarce until all old orders are cleared up. It is still believed here that the present differentials are discriminatory to the Pittsburgh district in that it is believed it will be impossible to bring enough material from distant points.

Philadelphia

As yet only a small volume of business has been done at the new prices while sellers concentrate on cleaning up old orders. The flow of scrap to mills has been in very good volume, permitting some additions to stock piles. Cast is approaching a critical position. Consumers are accepting stove plate and other secondary grades in place of prime cast. Pig iron is being used to a greater degree to fill the growing scrap deficiency.

St. Louis

Scrap iron dealers and brokers in the St. Louis district are concentrating on completing contracts before May 10. The supply in the country seems ample, and shipments continue heavy, with rainy weather holding up some deliveries slightly. Mills are not buying for the present. Prices are unchanged.

San Francisco

Pacific Coast scrap markets are still in a highly confused state as a result of government price fixing. A consumer of No. 2 steel scrap in Washington reports being unable to buy No. 2 steel scrap at \$13.50, the maximum price. Peddlers refuse to pick it up at the prices they can obtain. Cast scrap prices are in some instances higher than before the price fixing announcement. Here at San Francisco No. 1 cupola cast was quoted at \$18.50 to \$19 a net ton before the government order, but recently has been sold at \$18 and \$20 a net ton. Stove plate is being sold at about \$15, which is 50c. a ton above the fixed price for No. 1 heavy melting steel. A Los Angeles foundry paid \$22.50 a gross ton for cast scrap.

Detroit

Prices here will face some tests at the end of this month when automotive lists

are offered. Dealers' buying prices are unchanged for the second successive week and little likelihood of variation is foreseen. There still is not much business being transacted, but volume is increasing under the new prices as the trade readjusts itself. Little scrap is on the Detroit River docks, most of it having been moved in recent weeks. Three scrap classifications make their reappearance under the Detroit heading at prices which have prevailed for the past two weeks; these are long (skinned) turnings, automotive cast iron and sheet clippings.

New York

With drier and warmer weather, delivery of material to dealers' yards has improved, but not as markedly as expected. No new mill business has been transacted under the price set-up.

Cincinnati

Dealers are almost exclusively confining themselves to the purchase of material to apply on contracts for shipments prior to May 10, because there is a good margin of profit in most of these contracts. An attempt at a tentative dealers' buying price market is being made, but by and large these prices are only nominal and represent virtually "hoped for" quotations when the market begins to operate completely under the government ceiling prices.

Boston

Current business is very largely confined to old orders, although some material has been shipped to eastern Pennsylvania via barge at recent government established prices. Confusion still exists among the trade because of price disparities as related to consuming points. It now develops steel turnings can be shipped to Johnstown on a \$5.94 freight rate as against a Pittsburgh district rate of \$6.27. The Washburn Wire Co., Phillipsdale, R. I., is sounding out the heavy melting steel market.

Cleveland

The coal strike and consequent dwindling of pig iron output has been throwing a bigger load on scrap departments temporarily, but waning ingot output appeared inevitable at the start of this week if the coal impasse continued. The foundry scrap picture continues critical and the railroads are having difficulty drawing up their differentials.

Youngstown

A survey of principal Middle Western scrap consuming cities shows this area getting less and less scrap and probably the hardest hit of any district under the new differentials. The incentive to ship scrap here from Cleveland, Buffalo, Pittsburgh and other surrounding areas is no longer as powerful as it was.

Scrap Prices

Government ceiling prices are given in bold face type;
Market quotations as reported by THE IRON AGE are shown in italics.

Dollars per Gross Ton delivered to Consumers at:	Pitts- burgh	Chicago	Eastern Pennsyl- vania	Youngs- town	Cleve- land	Buffalo	Bir- ming- ham	St. Louis	New England	Duluth	Pacific Coast	Dealers' buying prices, Dollars f.o.b. cars:				
→												Cincin- nati	Detroit	New York*	Toronto	Export N. Y.
STEEL GRADES																
No. 1 heavy melting steel	\$20.00	\$18.75	\$18.75	\$20.00	\$19.50	\$19.25	\$17.00	\$17.50	\$15.50	\$18.00	\$14.50	\$16.00 to \$16.50	\$16.50 to \$17.00	\$15.25	\$12.50	\$15.25
No. 2 heavy melting steel	19.00	16.75 to 17.75	17.75	19.00	18.50	18.25	16.00	16.50	14.50	17.00	13.50	15.00 to 15.50	15.50 to 16.00	14.25	10.50	14.25
New black hyd. comp. sheets	20.00	18.75	18.75	20.00	19.50	19.25	17.00	17.50	15.50	18.00	14.50	16.00 to 16.50	16.50 to 17.00			
No. 1 dealers' bundles	19.00	17.75	17.75	19.00	18.50	18.25	16.00	16.50	14.50	17.00	13.50	15.00 to 15.50				
No. 2 dealers' bundles	18.00	16.75	16.75	18.00	17.50	17.25	15.00	15.50	13.50	16.00	12.00	14.00 to 14.50				
Mixed borings and turnings	15.50	14.25	14.25	15.50	15.00	14.75	12.50	13.00	9.25	13.50	10.00	10.00 to 11.00	12.00 to 12.50	10.75	9.50	
Machine shop turnings	15.50	14.25	14.25	15.50	15.00	14.75	12.50	13.00	9.40	13.50	10.00	10.00 to 11.00	11.00 to 11.50	10.75	9.00	
Shoveling turnings	16.50	15.25	15.25	16.50	16.00	15.75	13.50	14.00		14.50	11.00	11.50 to 12.50	12.00 to 12.50			
Heavy steel axle turnings	19.50				18.50											
Heavy steel forge turnings	18.50															
Drop forge flashings					18.50	18.25							16.00 to 16.50		10.50	
No. 1 busheling	19.50	18.25	18.25	19.50	19.00	18.75	16.50	17.00	15.00	17.50	14.00	15.50 to 16.00	16.00 to 16.50		7.50	
No. 2 busheling	15.50	14.25	14.25	15.50	15.00	14.75	12.50	13.00	11.00	13.50	10.00	10.00 to 10.50	9.50 to 10.00			
Uncut structural and plate scrap	19.00	17.75		19.00	18.50	18.25	16.00	16.50	14.50	17.00	13.50	15.00 to 15.50				
L. phos. billet, bar crops, p'ncos	25.00	23.75	23.75	25.00	24.50	24.25	22.00	22.50	20.50	23.00	19.50	20.00 to 20.50				
Low phos. heavy plate	24.50 to 25.00												19.00 to 19.50			
RAILROAD GRADES																
No. 1 RR heavy melting steel	\$21.00	\$19.75	\$19.75	\$21.00	\$20.50	\$20.25	\$18.00	\$18.50	\$16.50	\$19.00	\$15.50	\$18.00 to \$18.50	\$18.85			
Scrap rails	22.00	20.75	20.75	22.00	21.50	21.25	19.00	19.50	17.50	20.00	16.50	20.00 to 20.50	19.85	\$17.25		
Scrap rails 3 ft. and under	24.00	22.75	22.75	24.00	23.50	22.75	21.00	21.50	19.50	22.00	18.50	22.00 to 22.50	21.85	19.25		
Scrap rails 2 ft. and under	24.50	23.25	23.25	24.50	24.00	23.75	21.50	22.00	20.00	22.50	19.00	22.50 to 23.00	22.35	19.75		
Scrap rails 18 in. and under	25.00	23.75	23.75	25.00	24.50	24.25	22.00	22.50	20.50	23.00	19.50	23.00 to 23.50	22.85	20.25		
Rerolling rails	23.50	22.25	22.25	23.50	23.00	22.75	20.50	21.00	19.00	21.50	18.00	21.50 to 22.00	21.35	18.75		
RR couplers and knuckles	24.50 to 25.00															
Coil and leaf springs	25.00 to 25.50							22.00 to 22.50								
Steel wheels	25.00 to 25.50															
RR malleable	24.50 to 25.00				23.50			20.50 to 21.50								
Steel axles								25.50 to 26.00								
Locomotive tires								20.00 to 20.50								
FOUNDRY GRADES																
No. 1 cupola	\$22.50 to \$23.94	\$22.60	\$23.50 to \$24.50	\$22.50 to \$23.39	\$22.50	\$22.00 to \$22.50	\$18.00	\$22.50				\$20.00 to \$21.00	\$21.50 to \$22.00	\$21.00	\$20.00	
Heavy breakable cast	21.05 to 22.41	21.10	22.34 to 23.03	21.00 to 21.49	21.00	20.00 to 20.50		21.00	\$18.25			18.00 to 19.50	17.50 to 18.00	18.80	18.00	
Stove plate	17.55 to 18.94	17.60	18.84 to 19.53	17.50 to 18.39	17.50	17.00	13.00	17.50	14.50			14.00 to 15.00	15.00 to 15.50	17.50	16.00	\$17.50
Cast iron car wheels	22.55 to 23.94											17.00 to 18.50				
Grate bars					17.50			\$14.50 to \$15.00				14.00 to 15.00				
Cast iron borings	15.50	14.25	14.25	15.50	15.00	14.75	12.50	13.00	11.00	\$13.50	\$10.00	10.00 to 11.00	12.00 to 12.50	10.75	9.00	
Cast iron borings (chem.)																
Unprepared yard scrap														10.00		

* For delivery to Eastern Pennsylvania consumers

All consumers' prices subject to 3 per cent broker's commission.

Cincinnati: Loose sheet clippings, \$12.00 to \$12.50. Detroit: Long turnings, \$10.00 to \$10.50; Automotive cast, \$21.50 to \$22.00; Sheet clippings, \$13.00 to \$13.50.

Construction Steel

...STRUCTURAL STEEL, REINFORCING BARS, PLATES, PILING, ETC.

Reinforcing Steel

Awards of 14,710 tons; 6,420 tons in new projects.

AWARDS

ATLANTIC STATES

- 700 Tons, South Boston, government pier, to Concrete Steel Co., Boston, through Fitzgerald Construction Co., Boston, contractor.
- 550 Tons, Beaver County, Pa., Curtiss-Wright Corp., airplane propeller plant, to Bethlehem Steel Co., Bethlehem, Pa.
- 330 Tons, Devon, Conn., Connecticut Light & Power Co. power station, to Bethlehem Steel Co., Bethlehem, Pa., through United Engineers & Constructors, contractors.
- 300 Tons, Chester, Pa., four shipways and miscellaneous buildings for Sun Shipbuilding & Drydock Co., to Bethlehem Steel Co., Bethlehem, Pa., through Raymond Concrete Pile Co., contractor.
- 260 Tons, Bristol, R. I., Collins & Aikman Corp. building, to Bethlehem Steel Co., Bethlehem, Pa., through Turner Construction Co., contractor.
- 250 Tons, Jamaica, N. Y., sewage disposal plant, to Igoo Brothers, Newark, N. J.; Caye Construction Co., Inc., Brooklyn, contractor.
- 132 Tons, Long Island City, New York, Deer Park power plant, to Truscon Steel Co., Youngstown, through Silberblatt & Lasker.
- 100 Tons, New Haven, Conn., railroad bridge, to American Bridge Co., Pittsburgh, through George F. Collins Co., New York, contractor.
- 100 Tons, West Springfield, Mass., Bridge Street pumping station, to Truscon Steel Co., Boston, through J. G. Roy & Sons, Springfield, contractors.

SOUTH AND CENTRAL

- 1300 Tons, St. Louis, Clinton-Peabody housing project, to Laclede Steel Co., St. Louis, through Millstone construction Co., St. Louis, general contractor.
- 1260 Tons, St. Louis, Carr Square Village housing project, to Sheffield Steel Corp., Kansas City, Mo., through J. E. Dunn Construction Co., Kansas City, General contractor.
- 400 Tons, Chicago, State Street bridge substructure, to Olney J. Dean Co., Chicago.
- 300 Tons, Fort Wayne, Ind., superstructure, Studebaker plane engine gear plant, to Truscon Steel Co., Youngstown; Consolidated Construction Co., general contractor.
- 281 Tons, South Bend, Ind., Studebaker plane gear plant superstructure, to Truscon Steel Co., Youngstown.
- 200 Tons, Fairmont, W. Va., Westinghouse Electric & Mfg. Co. lamp plant, to Jones & Laughlin Steel Corp., Pittsburgh, through Metzger-Richardson Co.; Robert E. Lamb & Son, contractors.
- 175 Tons, Columbus, Ohio, WPA invitation No. 2-W-1513, to Bethlehem Steel

- Co., Bethlehem, Pa., through O. W. Merrill Supply Co.
- 150 Tons, Dubuque, Iowa, Mississippi River bridge, to Bethlehem Steel Co., Bethlehem, Pa.
- 126 Tons, Warren, Ohio, Trumbull Housing project, to Truscon Steel Co., Youngstown, through Charles Shutrump & Sons.
- 115 Tons, Columbus, Ohio, WPA invitation No. 5-W-1127, to Bethlehem Steel Co., Bethlehem, Pa., through O. W. Merrill Supply Co.
- 114 Tons, Memphis, Tenn., Greenwood School, to Truscon Steel Co., Youngstown, through H. J. Gilbertson & Co.
- 113 Tons, Columbus, Ohio, WPA invitation No. 6-W-1050, to Ben Tom Supply Co., Columbus, Ohio.
- 100 Tons, Cuyahoga County, Ohio, State highway project No. 327, to Builders Structural Steel Co., Cleveland, through National Engineering & Construction Co., contractor.
- 100 Tons, Texas City, Texas, building for Carbide & Chemical Corp., to Truscon Steel Co., Youngstown, through Ford-Bacon & Davis.
- 100 Tons, Canton, Ohio, joist for nurses home, to Truscon Steel Co., Youngstown.

WESTERN STATES

- 2265 Tons, Los Angeles, Los Angeles River improvement, section 5, Fourth Street to Aliso Street, to Blue Diamond Corp., Los Angeles, through Griffith Co., Los Angeles, contractor.
- 2200 Tons, Los Angeles River improvement, Arroyo Seco to North Broadway, to Soule Steel Co., San Francisco, through Griffith Co., contractor.
- 780 Tons, Los Angeles River improvement, section 7, to Soule Steel Co., San Francisco.
- 252 Tons, San Francisco, Treasury Department specification 10897, to Truscon Steel Co., San Francisco.
- 150 Tons, Delano, Cal., winery, to Truscon Steel Co., Youngstown, through Cahill Brothers.

BERMUDA

- 1500 Tons, Bermuda, U. S. Naval airbase, to Jones & Laughlin Steel Service, Inc., New York; F. H. McGraw & Co., and Purdy & Henderson Co., contractors.

PENDING REINFORCING BAR PROJECTS

ATLANTIC STATES

- 460 Tons, Rutherford, N. J., Berry's Creek viaduct.
- 280 Tons, Bergen County, N. J., highway bridge, route S-3, section 1; bids May 2.
- 127 Tons, Revere-Saugus, Mass., bridge FA-312-B (2).
- 120 Tons, Troy-Marlboro, N. H., four bridges (S.H.D.).
- 100 Tons, Newport, R. I., housing project, M. Spinelli & Sons, Inc., Boston, contractor.

CENTRAL STATES

- 1800 Tons, Cincinnati, Lincoln Court housing; H. M. Boyajohn, low bidder on general contract.

- 1000 Tons, Elwood, Ill., ammunition loading plant.
- 900 Tons, Stickney, Ill., sewage treatment works, division P; bids April 24.
- 600 Tons, Euclid, Ohio, Thompson Aircraft Co. buildings; Sam W. Emerson, low bidder on general contract.
- 500 Tons, Hastings, Minn., U. S. Engineer, lock and dam No. 2.
- 180 Tons, Hamilton County, Ohio, highway project No. 21.

WESTERN STATES

- 352 Tons, Los Angeles, State bridge over Los Angeles River; bids May 15.

Fabricated Steel

Lettings advance to 35,800 tons from 23,350 tons last week; new projects lower at 18,650 tons; plate awards total 1,375 tons.

AWARDS

NORTH ATLANTIC STATES

- 2000 Tons, Fairfield, Md., staging towers for Bethlehem Fairfield shipyard, to Bethlehem Steel Co., Bethlehem, Pa.
- 1650 Tons, Coatesville, Pa., building for Lukens Steel Co., Coatesville, Pa.
- 600 Tons, Philadelphia, pattern shop, Navy Department, to Bethlehem Steel Co., Bethlehem, Pa., through Barclay White Co., general contractor, Philadelphia.
- 586 Tons, Middle River, Md., airplane hangar for Glenn L. Martin Co., to Ingalls Iron Works Co., Pittsburgh plant.
- 500 Tons, Coatesville, Pa., repairs for Lukens Steel Co., to Belmont Iron Works, Philadelphia, through Arthur G. McKee & Co., Cleveland.
- 500 Tons, Brooklyn Navy Yard, to Easton Steel Co., Easton, Pa.; J. G. White Engineering Co., New York, contractor.
- 400 Tons, Corning, N. Y., building for Corning Glass Works, to Belmont Iron Works, Philadelphia.
- 275 Tons, Sidney, N. Y., Bendix Aviation Corp., center and west end additions, to American Bridge Co., Pittsburgh.
- 250 Tons, Philadelphia, additions to shipways, Cramp Shipbuilding Corp., to Bethlehem Steel Co., Bethlehem, Pa.
- 250 Tons, Eggertsville, N. Y., theater and stores for Guelich & Boebel Co., to R. S. McMannus Steel Construction Co., Buffalo.
- 230 Tons, Ballston, N. Y., Delaware & Hudson Railroad bridge No. 29.37, to American Bridge Co., Pittsburgh.
- 170 Tons, Greenwich, Conn., hospital boiler plant and laundry building, to White Plains Iron Works, White Plains, N. Y.
- 160 Tons, New York, contract No. 3-AP, asphalt plant, to American Bridge Co., Pittsburgh.
- 155 Tons, Chicago substructure, North State Street bridge, to American Bridge Co., Pittsburgh.
- 130 Tons, Dunkirk, N. Y., mill extension for Allegheny Ludlum Steel Corp., to Rogers Structural Steel Co., Corry, Pa.

Weekly Bookings of Construction Steel

Week Ended	Apr. 22,	Apr. 15,	Mar. 25,	Apr. 23,	Year to Date	
	1941	1941	1941	1940	1941	1940
Fabricated structural steel awards	35,800	23,350	17,400	13,000	510,235	232,710
Fabricated plate awards	1,375	120	200	2,410	51,280	50,505
Steel sheet piling awards	1,080	550	230	2,000	14,510	13,995
Reinforcing bar awards	14,710	25,800	9,700	4,510	209,310	133,880
Total Letting of Construction Steel	52,965	49,820	27,530	21,920	785,335	431,090

THE SOUTH

- 2200 Tons, Corpus Christi, Tex., two land plane hangars, to Virginia Bridge Co., Roanoke, Va.
900 Tons, Corpus Christi, Tex., seaplane hangar, to Bethlehem Steel Co., Bethlehem, Pa.
400 Tons, Little Creek, Va., mine installation facilities, to Virginia Bridge Co., Roanoke, Va.
250 Tons, Mobile, Ala., machine shop for Alabama Dry Dock & Shipbuilding Co., to Mobile Steel Co., Mobile.
130 Tons, Morgantown, W. Va., woman's dormitory, to Ingalls Iron Works Co., Birmingham.

CENTRAL STATES

- 7500 Tons, Dubuque, Iowa, toll bridge superstructure, to Bethlehem Steel Co., Bethlehem, Pa.
6700 Tons, Omaha, Neb., Glenn L. Martin Co. airplane plant, to Omaha Steel Works, Omaha, Neb.
5500 Tons, St. Louis, two 50-caliber gun plant units, to American Bridge Co., Pittsburgh.
2500 Tons, Cincinnati, building for Cincinnati Milling Machine Co., to Austin Co., Cleveland.
600 Tons, Akron, Ohio, building for Goodyear Tire & Rubber Co., to Bethlehem Steel Co., Bethlehem, Pa., through Hunkin-Conkey Co., Cleveland.
500 Tons, Fostoria, Ohio, chemical warfare plant, to Bethlehem Steel Co., Bethlehem, Pa.

WESTERN STATES

- 1500 Tons, Thorpe, Wash., bridge requirements of Northern Pacific Railway Co., to American Bridge Co., Pittsburgh.
800 Tons, San Francisco, United Airlines terminal, to Bethlehem Steel Co., San Francisco, through Barrett & Hilp, San Francisco, contractors.
650 Tons, Los Angeles, Los Angeles River improvement, bearing piles, Anoyo Seco to North Broadway, to Columbia Steel Co., San Francisco; Griffith Co., contractor.
250 Tons, Seattle, Carlisle Lumber Co. plant, to Isaacson Iron Works, Seattle.
125 Tons, Pleasanton, Cal., Alameda County bridge, to Bethlehem Steel Co., San Francisco, through E. T. Lesure, Oakland, Cal., contractor.

PENDING STRUCTURAL PROJECTS

NORTH ATLANTIC STATES

- 2250 Tons, Brooklyn, Brooklyn-Battery tunnel, contract No. 5.
1475 Tons, Bergen County, N. J., highway bridge, route S-3, section 1; bids May 2.
1000 Tons, Philadelphia, storehouse, reserve base Navy Department; bids taken.
650 Tons, Pedricktown, N. J., Delaware River pier, ordnance department for government.
550 Tons, Bound Brook, N. Y., three manufacturing buildings for Bakelite Corp.
500 Tons, New York, public school No. 21.
475 Tons, Trenton, N. J., telephone building, Bell Telephone Co.
450 Tons, Millville, N. J., addition to Armstrong Cork Co.
400 Tons, Brooklyn, addition to power plant, building No. 41, Navy Department.
350 Tons, New York, Harlem Hospital, 137th Street and Lenox Avenue.
270 Tons, Oswego, N. Y., addition and crane runway for Fitzgibbons Boiler Co.
260 Tons, Effingham-Freedom, N. H., State bridge over Ossipee River.
250 Tons, Syracuse, N. Y., Field Artillery armory.
230 Tons, Freedom-Effingham, N. H., State bridge.
200 Tons, Portsmouth, N. H.-Kittery, Me., bridge for Navy Department.
200 Tons, Troy, N. H., State bridge over Ashuelot River.
200 Tons, Brooklyn, kitchen buildings, Kings County Hospital.
170 Tons, Washington, metal storage building for Navy.
125 Tons, Hartford, Conn., Commerce Street State bridge.
110 Tons, Edgewood Arsenal, Md., addition to chemical warfare school for government.
110 Tons, Norwich, Conn., high school addition.
110 Tons, Port Deposit, Md., towers and frames for Wiley Equipment Co.
110 Tons, Jersey City, N. J., track stringer renewal.
100 Tons, Fort Ethan Allen, Vt., ordnance building.

THE SOUTH

- 275 Tons, Harlan County, Ky., Looney Creek State bridge.

- 225 Tons, Carlsbad, N. M., Pecos River State bridge, project No. 830-B (1).

CENTRAL STATES

- 1500 Tons, Watson, Ind., bag manufacturing building for government.
850 Tons, Hamilton County, Ohio, State project No. 21; bids in.
725 Tons, Peoria, Ill., addition to bottling house for Pabst Brewing Co.
600 Tons, Winona, Minn., South approach, State bridge No. 5900.
500 Tons, Columbus, Ind., State bridge No. 2141.
500 Tons, Columbus, Ohio, sheds for Army depot.
480 Tons, Fostoria, Ohio, National Carbon Co. chemical warfare building for Army.
270 Tons, Columbus, Ind., State bridge No. 2140.
225 Tons, Lafayette, Ind., State bridge No. 2143.
200 Tons, Canton, Ohio, boiler house for Timken Roller Bearing Co.
180 Tons, Greendale, Ind., State bridge No. 2146.
165 Tons, Jordan and Helena, Minn., bridges.
150 Tons, Portland, Ind., State bridge No. 2144.
150 Tons, Superior, Wis., Winslow S. E. station.
110 Tons, Cloquet, Minn., additions, soda mill, for Northwest Paper Co.

WESTERN STATES

- 854 Tons, Los Angeles, State bridge over Los Angeles River; bids May 15.
170 Tons, Bremerton, Wash., machine shop extension building No. 431, for Navy.

FABRICATED PLATES

AWARDS

- 1000 Tons, Sandusky, Ohio, pipe for TNT plant, to American Rolling Mill Co., Middletown, Ohio, through E. B. Badger & Sons, Boston.
378 Tons, Greenville, Miss., eight tanks for Standard Oil Co., to Ingalls Iron Works Co., Birmingham, Ala.

PENDING PROJECTS

- 2000 Tons, Cleveland, 10 barges for Standard Oil Co. of Ohio.

SHEET PILING

AWARDS

- 550 Tons, Los Angeles, Los Angeles River improvement, section 7, Atlantic to Randolph Streets, to Columbia Steel Co., San Francisco, through United Concrete Pipe Co., contractor.
530 Tons, Los Angeles Department of Water and Power, to Columbia Steel Co., San Francisco.

PENDING PROJECTS

- 1000 Tons, Pedricktown, N. J., pier, sheet and H-piling; bids April 28.
900 Tons, Hamilton County, Ohio, State project No. 21; bids in.

Pipe Lines

Globe Oil & Refining Co., Union National Bank Building, Wichita, Kan., plans new welded steel pipe line from point near McPherson, Kan., to Council Bluffs, Iowa, almost 225 miles, for gasoline transmission to latter place, where bulk terminal will be located. Cost about \$1,000,000 with booster pumping stations and other operating facilities, including terminal.

Cheney, Wash., Grover Chambers, superintendent of waterworks, plans purchase of about 2500 ft. of 6 in. inside diameter steel pipe for extensions in water system, alternate bids to be asked on cast iron pipe.

Cockburn Oil Corp., Commerce Building, Houston, Tex., plans welded steel pipe lines to points on Houston ship channel, including Pasadena and Manchester districts, for natural gas supply to industrial plants in these areas. Cost about \$85,000 with control stations and other operating facilities.

Magnolia Pipe Line Co., Magnolia Building, Dallas, Tex., has awarded contract to Oklahoma Contracting Co. of Texas, Inc., Magnolia Building, for new cast iron pressure welded joint pipe line from LaWard oil field to connection with present main Sealy-Vanderbilt pipe line, about seven miles, for crude oil transmission; four miles of line will be

6-in., and three miles 4-in. Cost close to \$70,000.

Water Department, San Bernadino, Cal., has let contract to Southern Pipe & Casing Co., Azusa, Cal., for 4500 ft. of 12-in. welded steel pipe, dipped and wrapped, for extensions in main water line; and to National Cast Iron Pipe Co., Birmingham, for 2000 ft. of 12-in. cast iron pipe, dipped and wrapped, for similar service.

City Council, Puyallup, Wash., is considering report of Parker & Hill, Smith Tower Building, Seattle, consulting engineers, recommending new 24-in. pressure pipe line, about five miles long, for main water line, to supplement existing pipe line. Cost about \$80,000, including extensions in reservoir, outlined in same report. Gordon Fox is city engineer.

Bureau of Reclamation, Denver, has awarded 1,185,000 ft. of 1-in. pipe to Laclede Steel Co., St. Louis, and 96,000 couplings to Westinghouse Electric & Mfg. Co., San Francisco, under Invitation 48,772-A.

San Francisco will take bids April 25 on 9300 ft. of 12-in., 10-gage welded steel pipe and 2700 ft. of 8-in., 12-gage similar pipe.

Cast Iron Pipe

Boston has awarded 263 tons of cement-lined pipe and 120 tons of unlined, also 159 tons of special castings to Warren Pipe Co. of Massachusetts, Boston.

Arkansas Power & Light Co., Pine Bluff, Ark., plans extensions in pipe lines at Eldorado, Ark., for water system. Work will be carried out by company forces.

Verdon, Neb., plans pipe line extensions in water system and other waterworks installation. Cost about \$30,000. Financing in part has been arranged through Federal aid, with remainder of \$13,200 to be a bond issue, recently voted.

LaGrange, Ohio, is arranging bond issue of \$40,000 for pipe line extensions in water system and other waterworks installation, including new 100,100-gal. elevated tank. Paul W. Elwell, 5005 Euclid Avenue, Cleveland, is engineer.

Orting, Wash., plans pipe line extensions in water system and other waterworks installation. Parker & Hill, Smith Tower Building, Seattle, consulting engineers, will make surveys and estimates of cost.

Rockford, Ill., H. S. Merz, superintendent, water department, plans pipe line extensions in water system in Grant Park and Kinsey sections, South Rockford and vicinity. Cost over \$200,000.

Glendive, Mont., plans pipe line extensions in water system and other waterworks installation, including reservoir expansion. Cost about \$65,000.

Wilmington, N. C., is arranging special election to approve bond issue of \$2,515,700 for pipe line extensions and replacements in water system and other waterworks installation. William C. Olsen, 5 Exchange Place, Raleigh, N. C., is consulting engineer.

Somerville, Tex., has approved bond issue of \$40,000 for water pipe line system and other waterworks installation, including elevated storage tank, hydrants, etc. Rollins & Forrest, Praetorian Building, Dallas, Tex., are consulting engineers.

Jackson County Water District No. 7, care of V. E. Phillips, Dierks Building, Kansas City, Mo., attorney and representative, has approved bonds for \$45,000, with additional fund of \$10,000 to be secured through Federal aid, for pipe line in Wornall Road to State Line, and from Seventy-ninth Terrace to Eighty-ninth Street. W. B. Collins & Co., Railway Exchange Building, Kansas City, Mo., are consulting engineers.

Sacramento, Cal., has taken bids on 239 tons of 4, 6, and 8-in. cast iron pipe, and fittings. Los Angeles Department of Water and Power has awarded 2355 tons of 4, 6, and 8-in. pipe as follows: 1171 tons to National Cast Iron Pipe Co., 614 tons to American Cast Iron Pipe Co., and 570 tons to United States Pipe & Foundry Co.

Pasadena, Cal., will take bids April 25 on 377 tons of 6, 8, and 12-in. pipe.

Prices of Finished Iron and Steel...

Steel prices on these pages are f.o.b. basing points (in cents per lb.) unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, deductions, and in most cases freight absorbed to meet competition.

Basing Point ↓ Product													DELIVERED TO		
	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio	Gulf Ports, Cars	Pacific Ports, Cars	Detroit	New York	Philadelphia
SHEETS															
Hot rolled	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢		2.65¢	2.20¢	2.34¢	2.27¢
Cold rolled ¹	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.15¢	3.39¢	3.37¢
Galvanized (24 ga.)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢		4.05¢		3.74¢	3.67¢
Enameling (20 ga.)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢		4.00¢	3.45¢	3.71¢	
Long ternes ²	3.80¢		3.80¢									4.55¢			
Wrought iron	4.75¢														
STRIP															
Hot rolled ³	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.20¢		
Cold rolled ⁴	2.80¢	2.90¢		2.80¢			2.80¢	(Worcester = 3.00¢)					2.90¢		
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢								
Commodity C-R	2.95¢			2.95¢			2.95¢	(Worcester = 3.35¢)					3.05¢		
TIN PLATE															
Standard cokes (Per 100-lb. base box)	\$5.00	\$5.00	\$5.00						\$5.10						
BLACK PLATE															
29 gage ⁵	3.05¢	3.05¢	3.05¢						3.15¢			4.05¢ (¹⁰)			
TERNES, M'FG.															
Special coated (Per base box)	\$4.30		\$4.30						\$4.40						
BARS															
Carbon steel	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢		(Duluth = 2.25¢)			2.50¢	2.80¢	2.25¢	2.49¢	2.47¢
Rail steel ⁶	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢					2.50¢	2.80¢			
Reinforcing (billet) ⁷	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.50¢	2.55¢	2.25¢		
Reinforcing (rail) ⁷	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢				2.40¢	2.45¢	2.15¢		
Cold finished ⁸	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢				(Detroit = 2.70¢)					
PLATES										(Coatesville and Claymont = 2.10¢)					
Carbon steel	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢			2.45¢	2.65¢		2.29¢	2.15¢
Wrought iron	3.80¢														
Floor plates	3.35¢	3.35¢									3.70¢	4.00¢		3.71¢	
Alloy	3.50¢	3.50¢				(Coatesville = 3.50¢)									
SHAPES															
Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢		(Bethlehem = 2.10¢)			2.45¢	2.75¢		2.27¢	2.215¢
SPRING STEEL C-R															
0.26 to 0.50 Carbon	2.80¢			2.80¢				(Worcester = 3.00¢)							
0.51 to 0.75 Carbon	4.30¢			4.30¢				(Worcester = 4.50¢)							
0.76 to 1.00 Carbon	6.15¢			6.15¢				(Worcester = 6.35¢)							
1.01 to 1.25 Carbon	8.35¢			8.35¢				(Worcester = 8.55¢)							
WIRE⁹															
Bright	2.60¢	2.60¢		2.60¢	2.60¢			(Worcester = 2.70¢)							
Galvanized	2.60¢	2.60¢		2.60¢	2.60¢			(Worcester = 2.70¢)							
Spring	3.20¢	3.20¢		3.20¢				(Worcester = 3.30¢)							
PILING															
Steel sheet	2.40¢	2.40¢				2.40¢						2.95¢			
IRON BARS															
Common		2.25¢				(Terre Haute, Ind. = 2.15¢)									
Refined	3.75¢														
Wrought	4.40¢														

¹ Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base. ² Unassorted 8-lb. coating. ³ Widths up to 12 in. ⁴ Carbon 0.25 per cent and less. ⁵ Applies to 29 gage within certain width and length limitations. ⁶ For merchant trade. ⁷ Straight lengths as quoted by distributors. ⁸ Also snaffing. For quantities of 20,000 to 39,999 lb. ⁹ Carload lots to manufacturing trade. ¹⁰ Boxed.

PRICES

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (Rerolling only). Prices delivered Detroit are \$2 higher f.o.b. Duluth, billets only, \$2 higher.

Per Gross Ton
Rerolling \$34.00
Forging quality 40.00

Shell Steel

Basic open hearth shell steel f.o.b. Pittsburgh and Chicago.

Per Gross Ton
3 in. to 12 in. \$52.00
12 in. to 18 in. 54.00
18 in. and over 56.00

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting to length, or quantity. This type of steel is for hot rolled sections used for the forging of shells and includes rounds, round squares, and special sections.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

Per Gross Ton
Open hearth or bessemer \$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

Per Lb.
Grooved, universal and sheared 1.90c.

Wire Rods

(No. 5 to 9/32 in.) *Per Lb.*
Pittsburgh, Chicago, Cleveland. 2.00c.
Worcester, Mass. 2.10c.
Birmingham 2.00c.
San Francisco 2.50c.
Galveston 2.25c.
9/32 in. to 47/64 in., \$3 a net ton higher. Quantity extras apply.

ROOFING TERNE PLATE

(F.o.b. Pittsburgh; Package, 112 Sheets)
20x14 in. 20x28 in.
8-lb. coating I.C. \$6.00 \$12.00
15-lb. coating I.C. 7.00 14.00
20-lb. coating I.C. 7.50 15.00
25-lb. coating I.C. 8.00 16.00
30-lb. coating I.C. 8.63 17.25
40-lb. coating I.C. 9.75 19.50

WIRE PRODUCTS

(To the Trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham)

Base per Keg
Standard wire nails \$2.55
Coated nails 2.55
Cut nails, carloads 3.85

Base per 100 Lb.
Annealed fence wire \$3.05

Base Column
Woven wire fence* 67
Fence posts (carloads) 69
Single loop bale ties 59
Galvanized barbed wire† 70
Twisted barbless wire 70

*15½ gage and heavier. †On 80-rod spools in carload quantities.

Note: Birmingham base same on above items, except spring wire.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List
Machine and carriage bolts:
½ in. and smaller by 6 in. and shorter 68
9/16 and ¾ in. by 6 in. and shorter 66
¾ to 1 in. by 6 in. and shorter 64
1½ in. and larger, all lengths 62
All diameters over 6 in. long 62
Lag, all sizes 65

Plow bolts 68½
Hot pressed nuts; c.p.c., t-nuts; square, hex., blank or tapped:
½ in. and smaller 66
9/16 to 1 in. inclusive 63
1½ to 1½ in. inclusive 61
1½ in. and larger 60

On above items, excepting plow bolts, additional allowance of 10 per cent for full container quantities.

On all of the above items there is an additional 5 per cent allowance for carload shipments.

Semi-fin. hexagon nuts U.S.S. S.A.E.
½ in. and smaller 66 70
9/16 to 1 in. 63 65
1½ in. through 1½ in. 61 62
1½ in. and larger 60

In full container lots, 10 per cent additional discount.

Stove bolts, packages, nuts loose 73 and 100
Stove bolts in packages, with nuts attached 73
Stove bolts in bulk 81

On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago, New York, lots of 200 lb. or over.

Large Rivets

(½ in. and larger)

Base per 100 Lb
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham \$3.40

Small Rivets

(7/16 in. and smaller)

Per Cent Off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham 65 and 10

Cap and Set Screws

Per Cent Off List

Milled hexagon head, cap screws, 1 in. dia. and smaller 50
Milled headless set screws, cut thread ¼ in. and larger 64
3/16 in. and smaller 73
Upset hex. head cap screws U.S.S. or S.A.E. thread 1 in. and smaller 68
Upset set screws, cup and oval points 74
Milled studs 52

Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

NON-FERROUS PRICES

Cents per lb. for early delivery

	Apr. 16	Apr. 17	Apr. 18	Apr. 19	Apr. 21	Apr. 22
Copper, Electrolytic¹	12.00	12.00	12.00	12.00	12.00	12.00
Copper, Lake	12.00	12.00	12.00	12.00	12.00	12.00
Tin, Straits, New York²	52.375	52.25	52.25	52.50	52.50	52.50
Zinc, East St. Louis	7.25	7.25	7.25	7.25	7.25	7.25
Lead, St. Louis³	5.70	5.70	5.70	5.70	5.70	5.70

¹ Mine producers' quotations only, delivered Conn. Valley. Deduct ¼c. for approximate New York delivery price. ² Add 0.39c. for New York delivery. ³ Add 0.15c. for New York delivery.

Warehouse Products

Cents per lb., Delivered

	New York	Cleveland
Tin		
Straits pig	53.25	55.00
Copper		
Electro	13.00	14.50
Castings	12.50	13.50
H. R. Sheets*	20.12	20.12
Seamless tubes*	20.62	20.62
Brass		
Yellow sheets*	18.65	18.65
Yellow, rods*	13.67	13.67
Seamless tubes*	21.40	21.40
Zinc		
Slabs	Nom'al	Nom'al
Sheet, No. 9 casks	Nom'al	Nom'al
Lead		
American pig	6.85	6.35
Bar	8.70	8.85
Cut sheets	9.00	9.10
Antimony		
Asiatic	16.00	17.00
Aluminum		
Virgin, 99%	20.00	21.00
No. 1 remelt., 98-99%	18.00	18.50
Solder		
½ and ½	32.00	32.75
Babbitt		
Anti-friction grade	23.50	21.75

Old Metals

Cents per lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators. Selling prices are those charged to consumers after the metal has been prepared for their use.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper		
Hvy crucible	10.375	11.00
Hvy. and wire	9.375	9.775
Light and bottoms	8.375	8.875
Brass		
Heavy	6.125	6.625
Light	5.125	5.875
No. 1 yel. turn	5.875	6.375
No. 1 red or compo. turnings	9.125	10.125
Hvy. Mach. compo.	9.50	9.725
Lead		
Heavy	5.00	5.50
Aluminum		
Cast	11.00-12.00	
Sheet	12.00-13.50	
Zinc	5.10	

Miscellaneous Non-Ferrous Prices

ALUMINUM, delivered: virgin, 99 per cent plus, 17c.-18c. a lb.; No. 12 remelt No. 2, standard, 16c. a lb. NICKEL electrolytic, 35c.-36c. a lb. base refinery. lots of 2 tons or more. ANTIMONY: prompt: Asiatic, 16.50c. a lb., New York; American, 13c. a lb., f.o.b. smelter. QUICK-SILVER, \$180-\$182, per flask of 76 lb. BRASS INGOTS, commercial 85-5-5-5, 13.25c. a lb.

*These prices, which are also for delivery from Chicago warehouses, are quoted with the following percentages allowed off for extras: on copper sheets, 33½; on brass sheets and rods, 40; on brass tubes, 33½, and copper tubes, 40.

PRICES

ALLOY STEEL

Alloy Steel Blooms, Billets and Slabs

Base per gross ton, f.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo or Bethlehem.....\$54.00

Alloy Steel Bars

Base per pound, f.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.

Open-hearth grade..... 2.70c.
Delivered, Detroit 2.80c.

S.A.E. Series Numbers	Alloy Differential, per 100 Lb.
2000 (1.5 Ni)	\$0.35

2100 (1.5 Ni)	0.75
2300 (3.5 Ni)	1.70
2500 (5 Ni)	2.55
3100 Ni-Cr	0.70
3200 Ni-Cr	1.35
3300 Ni-Cr	3.80
3400 Ni-Cr	3.20
4100 Cr-Mo (0.15 to 0.25 Mo.)	0.55
4100 Cr-Mo (0.25 to 0.40 Mo.)	0.75
x4340 Cr-Ni-Mo	1.70
4340 Cr-Ni-Mo	1.85
4600 Ni-Mo (0.2-0.3 Mo, 1.5-2 Ni)	1.20
5100 (0.60-0.90 Cr)	0.35
5100 (0.80-1.10 Cr)	0.45
5100 Cr spring steel	0.15
52-100 Cr. (electric furnace)	2.60
6100 Cr-V bar	1.20

6100 Cr-V spring steel.....	0.85
C-V	0.85

The above differentials are for hot rolled finished products. The differential for most grades in electric furnace steel is 50c. higher. Slabs with a section area of 16 in. and 2½ in. thick or over take the billet base.

Alloy Cold-Finished Bars

Base per pound, f.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.35c. Delivered Detroit, 3.45c. carlots.

Alloy Steel Plates

Base per lb., f.o.b. Pittsburgh, Chicago and Coatesville.
Open hearth grade3.50c.

STAINLESS AND HEAT-RESISTANT ALLOYS

(Base prices, cents per lb., f.o.b. Pittsburgh)

Chromium-Nickel

No.	304	302
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip	23.50c.	21.50c.
Cold rolled strip	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

Straight-Chromium

No.	410	430	442	446
Bars	18.50c.	19.00c.	22.50c.	27.50c.
Plates	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	26.50c.	29.00c.	32.50c.	36.50c.
H'tstrip	17.00c.	17.50c.	24.00c.	35.00c.
C'd st.	22.00c.	22.50c.	32.00c.	52.00c.

20% Chromium-Nickel Clad Steel

No.	304
Plates	18.00c.*
Sheets	19.00c.

*Includes annealing and pickling.

TOOL STEEL

(F.o.b. Pittsburgh)

	Base per Lb.
High speed	67c.
High-carbon-chromium	43c.
Oil-hardening	24c.
Special	22c.
Extra	18c.
Regular	14c.

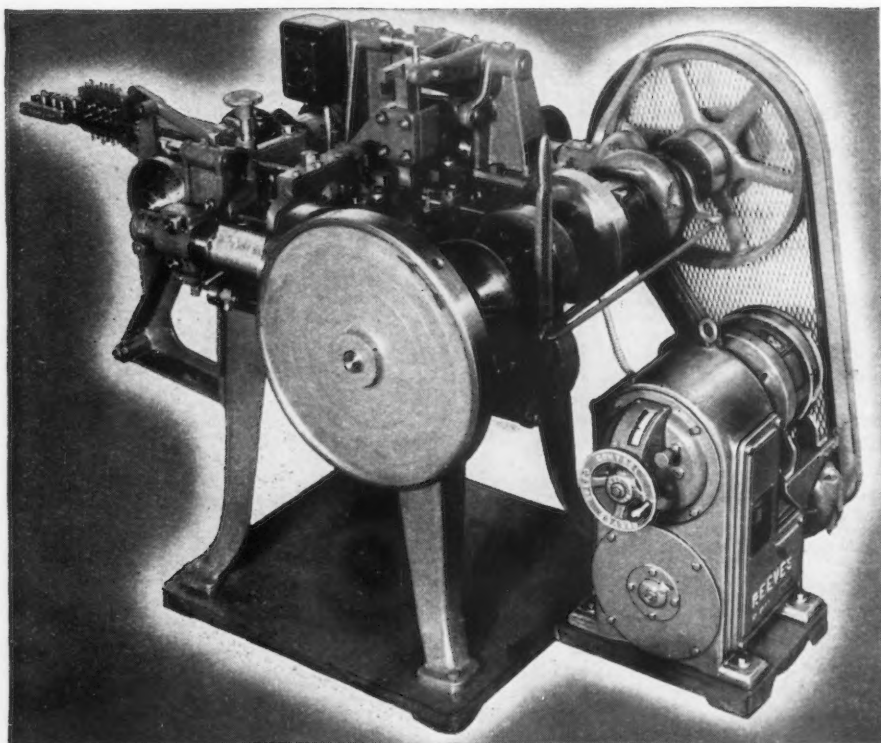
Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 3c. a lb. higher.

ELECTRICAL SHEETS

(F.o.b. Pittsburgh)

	Base per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Motor	4.95c.
Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

Silicon strip in coils—Sheet price plus silicon sheet extra width extra plus 25c. per 100 lb. for coils. Pacific ports add 70c. a 100 lb.



Four-slide Wire and Flat Metal Forming Machine
Built by A. H. Nilson Machine Co., Bridgeport, Conn.

IT'S A BETTER MACHINE WHEN IT'S EQUIPPED WITH REEVES SPEED CONTROL

Any production machine is a better machine when it can be operated at exactly the right speed for each job. On the metal forming machine shown here, "set-up" for different sizes and shapes or forms is a matter of minutes—simply by turning hand-wheel of REEVES Motodrive with which the machine is standardly equipped. Selection of the correct speed control unit for any machine is made easy by wide range of REEVES units available. Positive, accurate and dependable. Machines now in service may be similarly equipped. Write for 124-page Catalog-Manual G-397.

REEVES PULLEY COMPANY, Dept. I, COLUMBUS, INDIANA

▶ REEVES Speed Control

PRICES

CAST IRON WATER PIPE

	Per Net Ton
6-in. and larger, del'd Chicago..	\$54.80
6-in. and larger, del'd New York	52.20
6-in. and larger, Birmingham..	46.00
6-in. and larger f.o.b. dock, San Francisco or Los Angeles or Seattle	56.00

Class "A" and gas pipe, \$3 extra; 4-in. pipe is \$3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is \$45 at Birmingham and \$53.80 delivered Chicago.

BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes. Minimum Wall

(Net base prices per 100 ft., f.o.b. Pittsburgh, in carload lots)

	Seamless Cold Drawn	Lap Weld Hot Rolled
1 in. o.d. 13 B.W.G.	\$9.01	\$7.82
1 1/4 in. o.d. 13 B.W.G.	10.67	9.26
1 1/2 in. o.d. 13 B.W.G.	11.70	10.23
1 3/4 in. o.d. 13 B.W.G.	13.42	11.64
2 in. o.d. 13 B.W.G.	15.03	13.04
2 1/4 in. o.d. 13 B.W.G.	16.76	14.54
2 1/2 in. o.d. 12 B.W.G.	18.45	16.01
2 3/4 in. o.d. 12 B.W.G.	20.21	17.54
3 in. o.d. 12 B.W.G.	21.42	18.59
3 1/2 in. o.d. 11 B.W.G.	22.48	19.50
3 3/4 in. o.d. 11 B.W.G.	23.37	20.62
4 in. o.d. 10 B.W.G.	24.62	21.15
4 1/2 in. o.d. 10 B.W.G.	25.20	22.66
4 3/4 in. o.d. 10 B.W.G.	26.04	23.22
5 in. o.d. 9 B.W.G.	27.35	24.25
5 1/2 in. o.d. 9 B.W.G.	28.37	25.16
6 in. o.d. 7 B.W.G.	29.93	26.84

Extras for less carload quantities:

40,000 lb. or ft. over	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills (F.o.b. Pittsburgh only on wrought iron pipe)

Base Price = \$200 Per Net Ton

Butt Weld

Steel	Black	Galv.
1/8 in.	56	33
1/4 to 3/8 in.	59	40 1/2
1/2 in.	63 1/2	51
3/4 in.	66 1/2	55
1 to 3 in.	68 1/2	57 1/2

Wrought Iron	Black	Galv.
1/4 and 3/8 in.	+9	+33
1/2 in.	24	3 1/2
3/4 in.	30	10
1 and 1 1/4 in.	34	16
1 1/2 in.	38	18 1/2
2 in.	37 1/2	18

Lap Weld

Steel	Black	Galv.
2 in.	61	49 1/2
2 1/2 and 3 in.	64	52 1/2
3 1/2 to 6 in.	66	54 1/2
7 and 8 in.	65	52 1/2
9 and 10 in.	64 1/2	52
11 and 12 in.	63 1/2	51

Wrought Iron	Black	Galv.
2 in.	30 1/2	12
2 1/2 to 3 1/2 in.	31 1/2	14 1/2
4 in.	33 1/2	18
4 1/2 to 8 in.	32 1/2	17
9 to 12 in.	28 1/2	12

Butt weld, extra strong, plain ends

Steel	Black	Galv.
1/8 in.	54 1/2	38 1/2
1/4 to 3/8 in.	56 1/2	42 1/2
1/2 in.	61 1/2	50 1/2
3/4 in.	65 1/2	54 1/2
1 to 3 in.	67	57

Wrought Iron

1/4 and 3/8 in.	+10	+46
1/2 in.	25	6
3/4 in.	31	12
1 to 2 in.	38	19 1/2

Lap weld, extra strong, plain ends

Steel	Black	Galv.
2 in.	59	48 1/2
2 1/2 and 3 in.	63	52 1/2
3 1/2 to 6 in.	66 1/2	56

	Black	Galv.
7 and 8 in.	65 1/2	53
9 and 10 in.	64 1/2	52
11 and 12 in.	63 1/2	51

Wrought Iron

2 in.	33 1/2	15 1/2
2 1/2 to 4 in.	39	22 1/2
4 1/2 to 6 in.	37 1/2	21
7 and 8 in.	38 1/2	21 1/2
9 to 12 in.	32	17 1/2

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or \$4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or \$2 a ton higher, on all butt weld 8 in. and smaller.

Wise electric hoist buyers specify "SHAW-BOX"

Ask them why and they will give you one or all of these

7

REASONS WHY

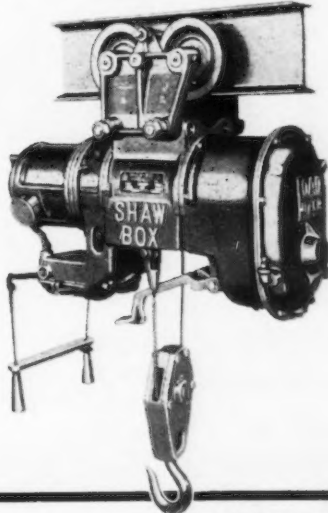
1. "One-point" Lubrication
2. Interchangeable Suspension
3. "Fool-proof" Upper Stop
4. Two-gear Reduction Drive
5. Hyatt Roller Bearings
6. Enclosed Construction
7. Ball Bearing Motor

They translate these reasons into one sentence:

They cost less to operate

Of course there are other electric hoists but none with all these Shaw-Box points of superiority.

What other hoist has had the long experience in thousands of plants and hundreds of industries lifting and saving for the owners and maintained such a splendid reputation.



Faster and more production; happier and more efficient workers; lowered costs and increased profits — these are the watchwords of Shaw-Box Electric Hoists.

There are sizes for your jobs, in lifting capacities from 250 lbs. to 20 tons, in combinations and arrangements to fit every special demand of industry.

For more than half-a-century we have designed and built hoists and cranes and all our knowledge is built into our products.

Send for catalog with complete illustrations and information. It may suggest a way for you to save money in your lifting.

Makers of all types and sizes of Electric and Hand Operated Cranes and Electric Hoists including the famous portable electric 'Budgit Hoists'. Send any inquiries for cranes or hoists to Shaw-Box.

SHAW-BOX CRANE & HOIST DIVISION

OF MANNING, MAXWELL & MOORE, INC.

M U S K E G O N , M I C H I G A N

PRICES

ORES

Lake Superior Ores

Delivered Lower Lake Ports

Per Gross Ton

Old range, bessemer, 51.50%...	\$4.75
Old range, non-bessemer, 51.50%	4.60
Mesaba, bessemer, 51.50%	4.60
Mesaba, non-bessemer, 51.50%	4.45
High phosphorus, 51.50%	4.35

Foreign Ores*

C.i.f. Philadelphia or Baltimore,
Exclusive of Duty

Per Unit

African, Indian, 44 to 48% Mn.	57c. to 61c.
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African, Indian, 49 to 51% Mn.	60c. to 65c.
Brazilian, 46 to 48% Mn...	54c. to 59c.
Cuban, del'd, duty free, 51% Mn.	67½c. to 71c.

Per Short Ton Unit

Tungsten, Chinese, Wolframite, duty paid, delivered	\$23 to \$24
Tungsten, domestic, scheelite, delivered	\$23.00
Chrome ore, lump c.i.f. Atlantic Seaboard, per gross ton: South African (low grade)	Nom.
Rhodesian, 45%	\$25.00
Rhodesian, 48%	\$28.00 to \$30.00

RAILS, TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than 60 lb., gross ton	\$40.00
Angle bars, 100 lb.	2.70

F.o.b. Basing Points

Light rails (from billets), gross ton	\$40.00
Light rails (from rail steel), gross ton	39.00

Base per Lb.

Cut spikes	3.00c.
Screw spikes	4.55c.
Tie plates, steel	2.15c.
Tie plates, Pacific Coast	2.30c.
Track bolts, steam railroads	4.15c.
Track bolts, discount to jobbers all sizes (per 100 counts)	65-5

Basing points, light rails—Pittsburgh, Chicago, Birmingham; spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minneapqua, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo; spikes alone—Youngstown, Lebanon, Pa., Richmond, Va.

FLUORSPAR Per Net Ton

Domestic washed gravel, 85-5 f.o.b. Kentucky and Illinois mines, all rail...	\$20.00 to \$21.00
Domestic, f.o.b. Ohio River land- ing barges	20.00 to 21.00
No. 2 lump, 85-5 f.o.b. Kentucky and Illinois mines	20.00 to 21.00
Foreign, 85% calcium fluoride, not over 5% Si, c.i.f. Atlantic ports, duty paid	Nominal
Domestic No. 1 ground bulk, 96 to 98%, calcium fluoride, not over 2½% silicon, f.o.b. Illi- nois and Kentucky mines	31.00
As above, in bags, f.o.b. same mines	32.60

REFRACTORIES

Fire Clay Brick Per 1000 f.o.b. Works

Super-duty brick at St. Louis	\$60.80
First quality Pennsylvania, Maryland, Kentucky, Missouri and Illinois	47.50
First quality, New Jersey	52.50
Second quality, Pennsylvania, Maryland, Kentucky, Mis- souri and Illinois	42.75
Second quality, New Jersey	49.00
No. 1 Ohio	39.90
Ground fire clay, per ton	7.10

Silica Brick

Pennsylvania	\$47.50
Chicago District	55.10
Birmingham	47.50
Silica cement, net ton (Eastern)	8.55

Chrome Brick

Net per Ton

Standard f.o.b. Baltimore, Plym- outh Meeting and Chester	\$50.00
Chemically bonded f.o.b. Balti- more, Plymouth Meeting and Chester, Pa.	

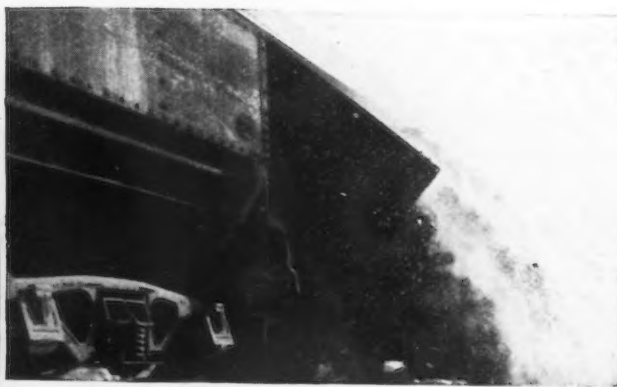
Magnesite Brick

Standard f.o.b. Baltimore and Chester	\$72.00
Chemically bonded, f.o.b. Balti- more	61.00

Grain Magnesite

Imported, f.o.b. Baltimore and Chester, Pa. (in sacks)	(—)*
Domestic, f.o.b. Baltimore and Chester in sacks	\$40.00
Domestic, f.o.b. Chewelah, Wash. (in bulk)	22.00

*None available.



60%

MORE EFFICIENT WASTE DISPOSAL

KOPPEL

Did you know that the new Koppel 50 cubic yard Automatic Air Dump car has increased waste disposal efficiency 60% ... and cut initial cost 27% below that of ordinary equipment?

If this sounds unbelievable or you would like to apply these savings to your own operations, we can furnish operating figures that will definitely interest you as a practical operating executive.

PRESSED STEEL CAR CO., INC.

(KOPPEL DIVISION)

NEW YORK PITTSBURGH CHICAGO

PRICES

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

Per Gross Ton

Domestic, 80% (carload).....\$120.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%.....\$36.00

Domestic, 26 to 28%..... 49.50

Electric Ferrosilicon

Per Gross Ton, Delivered Lump Size

50% (carload lots, bulk).....\$74.50*

50% (ton lots, packed)..... 87.00*

75% (carload lots, bulk).....135.00*

75% (ton lots, packed).....151.00*

Bessemer Ferrosilicon

Per Gross Ton, F.o.b. Jackson, Ohio

10.00 to 10.50%.....\$34.50

For each additional 0.50% silicon up to 12%, 50c. per ton is added. Above 12% add 75c. per ton.

For each unit of manganese over 2% \$1 per ton additional.

Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Silvery Iron

Per Gross Ton, F.o.b. Jackson, Ohio

5.00 to 5.50%.....\$28.50

For each additional 0.5% silicon up to 12%, 50c. a ton is added. Above 12% add 75c. a ton.

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Manganese, each unit over 2%, \$1 a ton additional. Phosphorus 0.75% or over, \$1 a ton additional.

Ferrochrome

Per Lb. Contained Cr., Delivered Carlots Lump Size, on Contract

4 to 6% carbon.....11.00c.

2% carbon17.50c.

1% carbon18.50c.

0.10% carbon20.50c.

0.06% carbon21.00c.

Spot prices are ¼c. per lb. of contained chromium higher.

Silico-Manganese

Per Gross Ton, Delivered, Lump Size, Bulk, on Contract

3% carbon\$113.00*

2.50% carbon 118.00*

2% carbon 123.00*

1% carbon 133.00*

Other Ferroalloys

Ferrotungsten, per lb. contained W, del. carload..... \$2.00

Ferrotungsten, 100 lb. and less 2.25

Ferrovandium, contract, per lb. contained V, del'd \$2.70 to \$2.90†

Ferrocolumbium, per lb. contained columbium f.o.b. Niagara Falls, N. Y., ton lots \$2.25†

Ferrocobalttitanium, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace, carload and contract, per net ton.....\$142.50

Ferrocobalttitanium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract per net ton.....\$157.50

*Spot prices are \$5 per ton higher.

†Spot prices are 10c. per lb. of contained element higher.

Ferrophosphorus, electric or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with \$3 unitage, freight equalized with Rockdale, Tenn., per gross ton 58.50

Ferrophosphorus, electrolytic 23-26% in carlots, f.o.b. Monsato (Siglo), Tenn., 24%, per gross ton, \$3 unitage, freight equalized with Nashville 75.00

Ferromolybdenum, per lb. Mo, f.o.b. furnace 95c.

Calcium molybdate, per lb.

Mo, f.o.b. furnace 80c.

Molybdenum oxide briquettes

48-52% Mo, per lb. contained Mo, f.o.b. Langeloth, Pa. 80c.

FUEL OIL

No. 3, f.o.b. Bayonne, N. J.4.70c.

No. 6, f.o.b. Bayonne, N. J.3.21c.

No. 5 Bur. Stds., del'd Chicago...3.25c.

No. 6 Bur. Stds., del'd Chicago...2.75c.

No. 3 distillate, del'd Cleveland...5.50c.

No. 4 industrial, del'd Cleveland...5.25c.

No. 5 indus., del'd Cleveland...5.125c.

No. 6 indus., del'd Cleveland...4.875c.



PARISH

STAMPINGS

Travel Light

CARLINE BRACKET — Used for connection between side posts and roof carlines in body frame construction of present type trailers.

Buses, trailers, railroad cars, and all transportation units, earn dividends through light weight construction. This is made possible by using high

strength, corrosion resistance stampings.

To witness:—These brackets made by Parish are of .050" Ga. and 3/16" High Tensile Steel. They bring sturdy endurance, increased pay-load capacity to trailers.

Parish engineers can bring an added value to your product. Let us show you how.



PARISH PRESSED STEEL CO.

READING, PENNA.

Pacific Coast Representative
F. Somers Peterson Co.,
57 California St.,
San Francisco, California



SPRING BRACKET — For trailer, made of several pressed steel plates welded to form the assembly shown. Lighter and Stronger.

PRICES

COKE

Per Net Ton

Furnace, f.o.b. Connellsville, prompt	\$5.50 to \$5.75
Foundry, f.o.b. Connellsville, prompt	\$6.00 to \$6.50
F'dry, by-product, Chicago	10.50
F'dry, by-product, New England	13.00
Foundry, by-product, Newark or Jersey City	\$11.30 to \$11.90
F'dry, by-product, Philadelphia	11.63
F'dry, by-product, Cleveland	11.55
F'dry, by-product, Cincinnati	11.00
Foundry, Birmingham	7.50
F'dry, by-product, St. Louis	\$10.75 to \$11.00

BRITISH

Per Gross Ton, f.o.b. United Kingdom Ports

Ferromanganese, export	£29 16s. 3d.
Tin plate, per base box	32s. to 33s.
Steel bars, open hearth	£16 10s.
Beams, open hearth	£19 10s.
Channels, open hearth	£19 10s.
Angles, open hearth	£15 10s.
Black sheets, No. 24, gage	£22 5s. max.* £22 5s. min.**
Galvanized sheets, No. 24 gage	£25 12s. 6d. max.*; £25 12s. 6d. min.**

*Empire markets only.

**Other than Empire markets.

PIG IRON (Per Gross Ton)

Prices delivered various consuming points indicated by bold italics

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phos.
Boston	\$25.50	\$25.00	\$26.50	\$26.00	.....
Brooklyn	27.50	.....	.....	28.00	.....
Jersey City	26.53	26.03	27.53	27.03	.....
Philadelphia	25.84	25.34	26.84	26.34	.....
Bethlehem, Pa.	\$25.00	\$24.50	\$26.00	\$25.50	.....
Everett, Mass.	25.00	24.50	26.00	25.50	.....
Swedeland, Pa.	25.00	24.50	26.00	25.50	.....
Steelton, Pa. ....	.....	24.50	.....	.....	29.50
Birdsboro, Pa.	25.00	24.50	26.00	25.50	29.50
Sparrows Point, Md.	25.00	24.50	.....	.....	.....
Erie, Pa.	24.00	23.50	25.00	24.50	.....
Neville Island, Pa.	24.00	23.50	24.50	24.00	.....
Sharpville, Pa. ††	24.00	23.50	24.50	24.00	.....
Buffalo	24.00	23.00	25.00	24.50	29.50
Cincinnati	24.44	24.61	.....	25.11	.....
Canton, Ohio	25.39	24.89	25.89	25.39	.....
Mansfield, Ohio	25.94	25.44	26.44	25.94	.....
St. Louis	24.50	24.02	.....	.....	.....
Chicago	24.00	23.50	24.50	24.00	.....
Granite City, Ill.	24.00	23.50	24.50	24.00	.....
Cleveland	24.00	23.50	24.50	24.00	.....
Hamilton, Ohio	24.00	23.50	.....	24.00	.....
Toledo	24.00	23.50	24.50	24.00	.....
Youngstown ††	24.00	23.50	24.50	24.00	.....
Detroit	24.00	23.50	24.50	24.00	.....
St. Paul	26.63	.....	27.13	26.63	.....
Duluth	24.50	.....	25.00	24.50	.....
Birmingham	20.38	19.00	25.00	.....	.....
Los Angeles, San Francisco and Seattle	27.50	.....	.....	.....	.....
Provo, Utah	22.00	.....	.....	.....	.....
Montreal †	27.50	27.50	.....	28.00	.....
Toronto †	25.50	25.50	.....	26.00	.....

GRAY FORGE

Valley or Pittsburgh fce.....\$23.50

CHARCOAL

Lake Superior fce.....\$27.00
Delivered Chicago

Base prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Delivered prices on Southern iron for shipment to Northern points are 38c. a ton below delivered prices from nearest Northern basing point on iron with phosphorus content of 0.70 per cent and over. †On all grades 2.25 per cent silicon and under is base. For each 25 points of silicon over 2.25 per cent an extra of 25c. is charged.

††Pittsburgh Coke & Iron and Struthers furnaces are quoting \$24.50 a ton for No. 2 foundry, basic and malleable, and \$25.00 a ton for bessemer iron at Sharpville and Youngstown.

WAREHOUSE PRICES

	Pitts- burgh	Chicago	Cleve- land	Phila- delphia	New York	Detroit	Buffalo	Boston	Birm- ingham	St. Louis	St. Paul	Mil- waukee	Los Angeles
Sheets, hot rolled	\$3.35	\$3.05	\$3.35	\$3.75	\$3.58	\$3.23	\$3.25	\$3.71	\$3.45	\$3.39	\$3.30	\$3.38	\$4.30
Sheets, cold rolled .....	.....	4.10	4.05	4.05	4.60	4.30	4.30	3.68	.....	4.12	4.35	4.23	6.50
Sheets, galvanized	4.75	4.60	4.62	4.90	5.00	4.64	4.75	5.11	4.75	4.87	4.75	4.98	5.25
Strip, hot rolled	3.60	3.40	3.50	3.95	3.96	3.48*	3.82	4.06	3.70	3.74	3.65	3.73	.....
Strip, cold rolled	3.20	3.30	3.20	3.31	3.51	3.20	3.52	3.46	.....	3.61	3.83	3.54	.....
Plates	3.40	3.55	3.40	3.75	3.76	3.60	3.62	3.85	3.35	3.69	3.80	3.68	4.15
Structural shapes	3.40	3.55	3.58	3.75	3.75	3.65	3.40	3.85	3.55	3.69	3.80	3.68	4.15
Bars, hot rolled	3.35	3.50	3.25	3.85	3.84	3.43	3.35	3.98	3.50	3.64	3.75	3.63	4.15
Bars, cold finished	3.65	3.75	3.75	4.06	4.09	3.80	3.75	4.13	4.43	4.02	4.34	3.88	6.60
Bars, ht. rld. SAE 2300	7.20	7.10	7.55	7.31	7.60	7.42	7.35	7.50	.....	7.72	7.45	7.58	9.55
Bars, ht. rld. SAE 3100	5.75	5.65	5.85	5.86	5.90	5.97	5.65	6.05	.....	6.02	6.00	5.88	8.55
Bars, cd. drn. SAE 2300	8.15	8.15	8.40	8.56	8.84	8.45	8.40	8.63	.....	8.77	8.84	8.63	10.55
Bars, cd. drn. SAE 3100	6.75	6.75	7.75	7.16	7.19	7.05	6.75	7.23	.....	7.12	7.44	6.98	9.55

BASE QUANTITIES: Hot rolled sheets, cold rolled sheets, hot rolled strip, plates, shapes and hot rolled bars, 400 to 1999 lb.; galvanized sheets, 150 to 1499 lb.; cold rolled strip, extras apply on all quantities; cold finished bars, 1500 lb. and over; SAE bars, 1000 lb. and over. Exceptions: Chicago, galvanized sheets, 500 to 1499 lb.; Philadelphia, galvanized sheets, one to nine bundles, cold rolled sheets, 1000 to 1999 lb.; Detroit, galvanized sheets, 500 to 1499 lb.; Buffalo, cold rolled sheets, 500 to 1500 lb.; galvanized sheets, 450 to 1499 lb.; cold rolled strip, 0.0971 in. thick; Boston, cold rolled and galvanized sheets, 450 to 3749 lb.; Birmingham, hot rolled sheets, strip and bars, plates and shapes, 400 to 3999 lb.; galvanized sheets, 500 to 1499 lb.; St. Louis, cold rolled sheets, 400 to 1499 lb.; galvanized sheets, 500 to 1499 lb.; Milwaukee, cold rolled sheets, 400 to 1499 lb.; galvanized sheets, 500 to 1499 lb.; New York, hot rolled sheets, 0 to 1999 lb.; cold rolled sheets, 400 to 1499 lb.; St. Paul, galvanized and cold rolled sheets, any quantity, hot rolled bars, plates, shapes, hot rolled sheets, 400 to 14,999 lb.; Los Angeles, hot rolled sheets, bars, plates, shapes, cold rolled sheets, 300 to 1999 lb.; galvanized sheets, 24 ga.—1 to 6 bundles. Extras for size, quality, etc., apply on above quotations. *12 gage and heavier, \$3.23.

**MOVE YOUR DEFENSE
MATERIAL**

FASTER WITH **PHILCO BATTERIES**

One word is all-important in production schedules today—"speed!" Materials must be moved faster than ever before . . . production must be stepped up to match a greater defense program.

Philco Batteries with 10% EXTRA CAPACITY in the same compartment space give your electric trucks what they need to answer

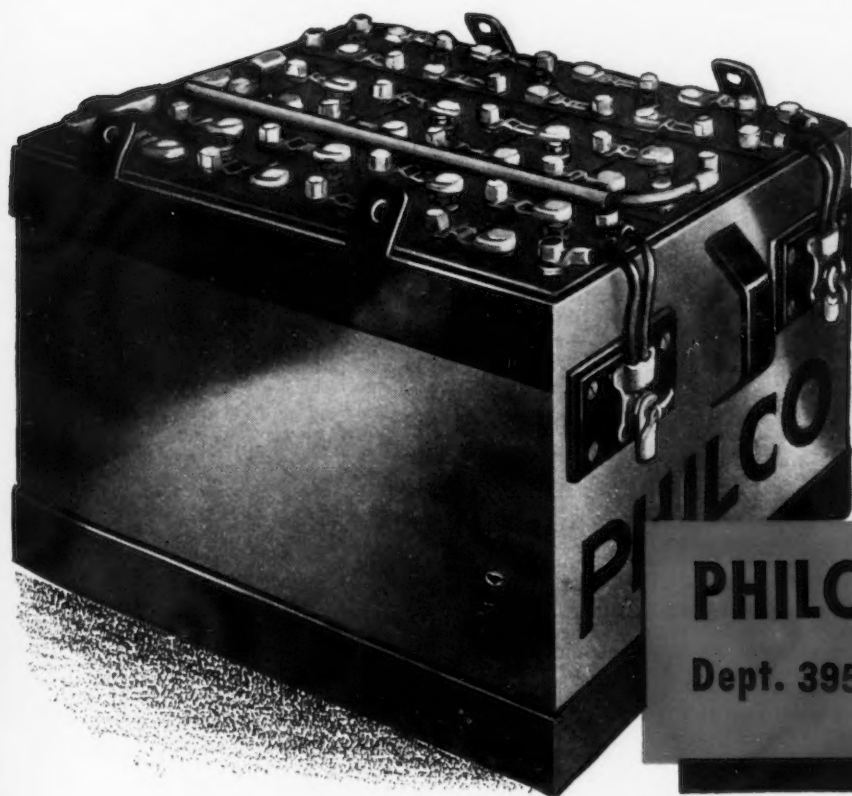
the vital call for speed! Ample capacity to do the entire day's work under peak conditions! And Triple Insulation insures dependability and trouble-free performance with lower charging and maintenance costs.

Investigate! Specify Philco Batteries for either your present trucks or for new electric trucks. Let our Philco engineers help you.

**The Only Triple-Insulated
Batteries that give you**

**10% EXTRA
CAPACITY**

in the same compartment space!



PHILCO, Battery Division

Dept. 395

Philadelphia, Pa.

Sales Possibilities

... CONSTRUCTION, PLANT EXPANSION AND EQUIPMENT BUYING

North Atlantic States

• **Scovill Mfg. Co., Inc.**, Waterbury, Conn., brass, bronze, copper and other metal products, has let general contract to Turner Construction Co., 420 Lexington Avenue, New York, for one-story addition, 133 x 314 ft., with part mezzanine floor. Cost over \$175,000 with equipment. C. A. Kendall is company engineer.

Auto-Ordnance Corp., Bridgeport, Conn., sub-machine guns and parts, has purchased former local plant of Raybestos-Manhattan, Inc., for branch plant for production of jigs, tools, gages and certain gun parts.

Bureau of Yards and Docks, Navy Department, Washington, plans additional buildings, shops and other facilities, including training units, at naval submarine base, New London, Conn. Fund of \$775,000 is being arranged for project. Also expansion in shipbuilding and repair yard at South Boston, Mass., including mechanical-handling equipment, etc. An appropriation of \$3,090,000 will be arranged for work.

Locke Steel Chain Co., Connecticut Avenue, Bridgeport, Conn., sprocket wheel chains and other chain products, plans one-story addition. Cost close to \$50,000 with equipment. Westcott & Mapes, Inc., 139 Orange Street, New Haven, Conn., is consulting engineer.

United Aircraft Corp., Hamilton Standard Propeller Division, East Hartford, Conn., plans expansion, including one-story building and equipment for production for Navy Department. Government has authorized fund of \$1,035,000 for project. Pratt & Whitney Division, same place, airplane engines and parts, is clearing site on adjoining tract for one-story addition, about 500,000 sq. ft. of floor space, for production for Government. Cost over \$2,000,000 with machinery.

Handy & Harman, Inc., 82 Fulton Street, New York, gold, platinum and other precious metals, has let general contract to Gellatly Construction Co., 25 Housatonic Avenue, Bridgeport, Conn., for one-story addition to branch refinery at 1770 Kings Highway, Fairfield, Conn., 60 x 210 ft. Cost over \$75,000 with equipment.

Ford Instrument Co., Rawson Street, Long Island City, gun control and calculator instruments and parts, a subsidiary of Sperry Corp., Brooklyn, has purchased plant of Anchor Cap & Closure Corp., Long Island City, consisting of a main six-story structure and smaller unit, totaling about 310,000 sq. ft. of floor space, for new plant to give employment to about 1000 operatives. Plant is scheduled to be ready for service in about six months.

American Locomotive Co., 30 Church Street, New York, has let general contract to Thompson Construction Co., 11 North Pearl Street, Albany, N. Y., for two-story addition to plant at Schenectady, N. Y., 50 x 260 ft. Cost close to \$150,000 with equipment.

National Biscuit Co., 449 West Fourteenth Street, New York, has purchased about 50 acres, bounded by Kedzie and Homan Avenues, 73rd Street and Belt Line Railway, Chicago, for new branch plant. It will comprise one and multi-story building, with auxiliary structures, machine shop, steam power house and other units. Cost about \$5,000,000 with traveling ovens, mixing machinery, conveyors, other equipment. Work is scheduled to begin soon.

Bureau of Yards and Docks, Navy Department, Washington, has let joint contract to Walsh Construction Co., J. Rich Steers, Inc., 17 Battery Place, and Cauldwell-Wingate Co., 101 Park Avenue, New York, for new dry-docks and auxiliary structures at Brooklyn Navy

Yard, on cost-plus-fixed-fee-basis, estimated at \$31,000,000 with equipment.

Art Metal Construction Co., Jones Street and Gifford Avenue, Jamestown, N. Y., steel and bronze interior fixtures, etc., plans one-story addition to plant No. 2, about 40 x 75 ft. Cost close to \$50,000 with equipment. O. R. Johnson, Fenton Building, is architect.

Grain League Federation Mills, Inc., Chamber of Commerce, Buffalo, plans expansion and improvements in grain and feed mill, including new 1,000,000-bu. grain elevator and auxiliary structure. Cost over \$900,000 with elevating, conveying, screening and other mechanical equipment. A. E. Baxter Engineering Co., 344 Delaware Avenue, is consulting engineer.

Buffalo Niagara Electric Corp., Electric Building, Buffalo, has arranged appropriation of about \$4,700,000 for expansion and improvements, of which \$1,500,000 will be used for addition to Huntley steam-electric generating plant, and remainder for transmission and distributing lines, power substations and other structures.

Star Electric Motor Co., 135 Bloomfield Avenue, Bloomfield, N. J., motors, generators, motor-generator sets, etc., has purchased one-story building, with adjoining one-story structures and two-story office, on about 8½ acres at Bloomfield and Watsessing Avenues. Plant totals about 165,000 sq. ft. of floor space. Present works will be removed to new location beginning in May and additional equipment installed.

Moser Jewel Co., 367 Division Street, Perth Amboy, N. J., jewel bearings for precision apparatus, plans expansion for production of bearings for aircraft instruments for War Department. Fund of \$45,412 will be furnished by Defense Plant Corp., Washington, Federal agency, for purchase of equipment and facilities.

National Lead Co., 111 Broadway, New York, has let general contract to Wigton-Abbott Corp., 60 East Forty-second Street, for three-story and basement addition, about 40 x 75 ft., to branch plant at Sayreville, N. J. Cost over \$80,000 with equipment.

Marine Maintenance Corp., subsidiary of Sword Steamship Line, Inc., 76 Beaver Street, New York, has acquired waterfront tract of 28 acres on Kill von Kull at Constable Hook, Bayonne, N. J., for a marine repair plant for vessels of parent company, with shops, docks and other facilities, with division for barge construction. Present shops at Jersey City, N. J., will be removed to new location, with additional equipment for expansion.

Philadelphia Bronze & Brass Corp., Twenty-second and Master Streets, Philadelphia, bronze, brass and other metal castings, has let general contract to Lauter Construction Co., 1613 Sansom Street, for two-story addition, 55 x 60 ft. Cost over \$50,000 with equipment. Samuel D. Milner, 1117 Foulkrod Street, is architect.

R. F. Sedgley, Inc., Ontario and J Streets, Philadelphia, firearms, has organized a subsidiary, Sedgley Machine Guns, Inc., to operate plant for production of a light-weight machine gun and parts for Army. Eugene J. Hynes, president of parent company, will head new organization.

Barnard Aviation Equipment Co., Waller Street, Wilkes-Barre, Pa., airplane equipment and parts, plans one-story addition and improvements in present plant. Cost close to \$75,000 with equipment.

Carpenter Steel Co., Reading, Pa., has let general contract to Reading Contracting Co., 622 Court Street, for one-story addition, about 200 x 500 ft. Cost over \$500,000 with equip-

ment. Muhlenberg, Yerkes & Muhlenberg, Ganster Building, are architects.

National Forge & Ordnance Co., Irvine, Pa., has let general contract to E. G. Smith, Bellevue, Pa., for new plant, comprising two one-story units, 60 x 200 ft., and 45 x 520 ft., for general production, and storage and distribution, in order noted.

Division of Purchase, Sales and Traffic, Department of Agriculture, Washington, asks bids until April 28 for one belt-driven centrifugal pump (Circular 2258).

Bureau of Yards and Docks, Navy Department, Washington, plans expansion in ordnance-manufacturing division at local navy yard, including additional equipment. Appropriation of \$960,000 is being arranged for work; also plans extensions in submarine base at Coco Solo, Canal Zone, with new shops and other facilities. Cost about \$1,000,000 with equipment. Appropriation in that amount is being arranged.

Glenn L. Martin Co., Middle River, Baltimore, airplanes and parts, plans expansion for production of aircraft for War Department, comprising six one-story buildings for parts production and assembling, and a complete new plant. Entire project will cost about \$24,275,000, which will be provided by Government. It is estimated that \$15,145,200 will be used for plant structures and remainder for purchase of equipment.

The South

• **Pittsburgh Metallurgical Co.**, 3801 Highland Avenue, Niagara Falls, N. Y., has acquired about 60 acres in Tuxbury district, near Charleston, S. C., for new plant for production of ferro-alloys, including storage and distributing buildings, electric furnaces and other facilities. Contract has been made for electric power supply with South Carolina Public Service Authority, Charleston, which is completing new hydroelectric generating station in vicinity of Moncks Corner, S. C. Transmission lines will be built to plant site, where new power substation will be located. Entire project will cost close to \$1,000,000.

United States Engineer Office, Louisville, asks bids until May 1 for electric-operated pumping station at Deshee Ditch, Brevoort levee project, Knox County, Ind., comprising three pumping units of 42,000-gal. per min. capacity, with motors, controls and accessory equipment; also electric power transmission line, sluice gates and lifts, and other equipment.

Central Electric Refrigeration Corp., Oak Hill, Ala., asks bids until April 30 for new electric-operated refrigerating and cold storage plant. Cost close to \$45,000 with equipment. C. T. Baker, 1070 Spring Street, N. W., Atlanta, Ga., is consulting engineer.

Alabama Dry Dock & Shipbuilding Co., Mobile, Ala., plans expansion and improvements in shipbuilding and repair works, including new shops and other buildings. Cost about \$3,000,000 with equipment, part of fund to be used for dredging Pinto Pass, between Mobile and Tensas Rivers, for improved waterway facilities to yard.

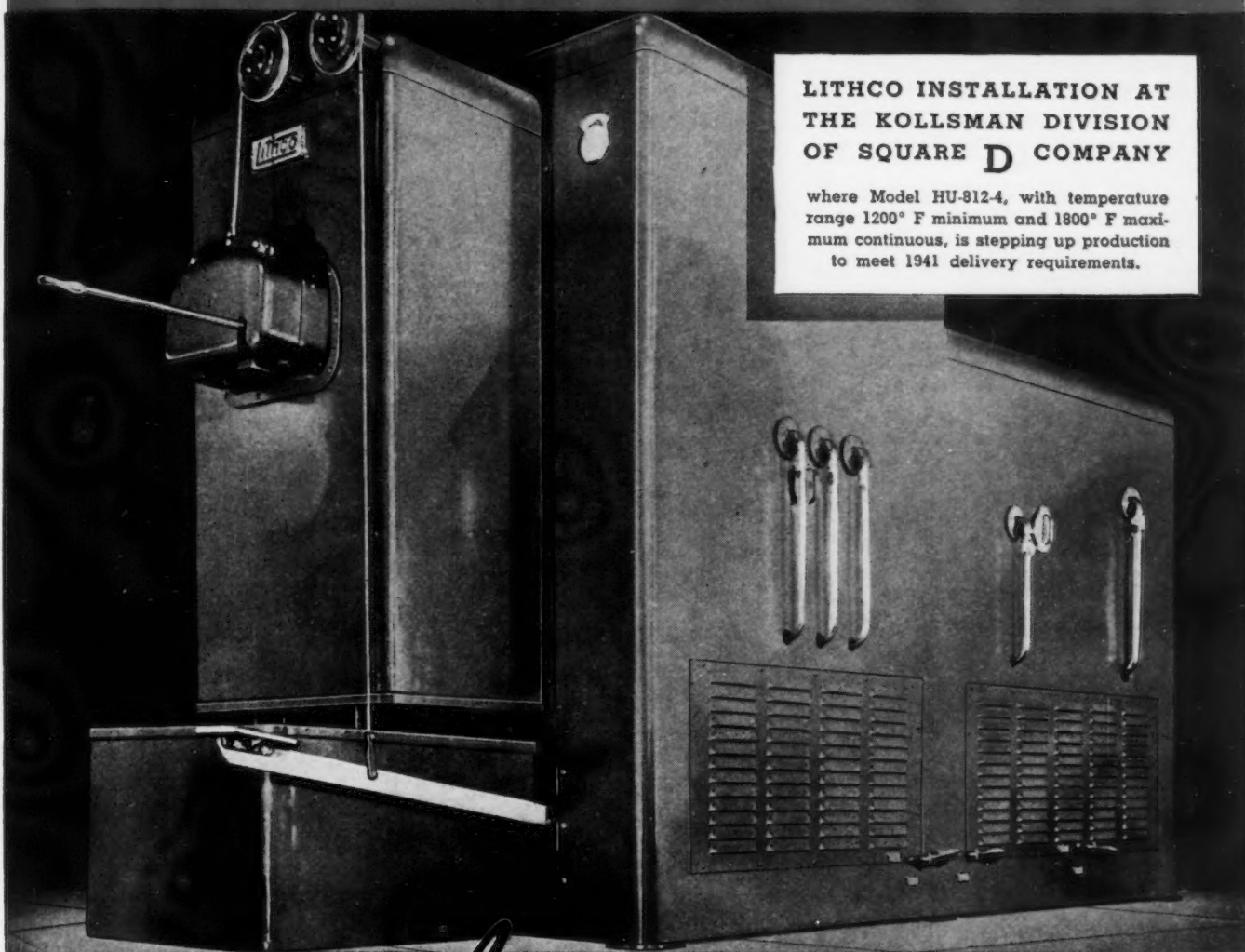
Constructing Quartermaster, Camp Shelby, Miss., asks bids until May 6 for construction of seven ordnance warehouses and one ordnance repair shop, including 10-ton traveling crane for latter structure (Circular 6133-1).

Bureau of Yards and Docks, Navy Department, Washington, plans expansion in naval station, Key West, Fla., including additional shops and buildings for repair and reconditioning of submarines and surface craft, additional housing facilities, etc. Cost about

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\$1,517,000. Appropriation in that amount is being arranged.

Reed Roller Bit Co., Mack Street, Houston, Tex., rotary drilling tools for oil wells, parts, etc., has asked bids on general contract for one-story addition, 95 x 251 ft. Cost over \$75,000 with equipment.

San Antonio Machine & Supply Co., 325 North Centre Street, San Antonio, Tex., machinery and parts, tools, etc., has let general contract to A. E. Rheiner & Co., Builders' Exchange Building, for new one-story machine shop, storage and distributing plant at Corpus Christi, Tex. Cost over \$75,000 with equipment. Brock, Roberts & Anderson, Jones Building, are architects; Matthews & Keenan, Smith-Young Tower Building, engineers, all San Antonio.

Central States

• **Monarch Cap Screw & Mfg. Co.**, 5906 Park Avenue, Cleveland, has let general contract to James Humel, 3124 Albion Road, for one-story addition, 80 x 120 ft. Cost over \$50,000 with equipment.

Cleveland Hobbing Machine Co., 1170 East 152nd Street, Cleveland, machine tools and parts, has asked bids on general contract for new one-story plant, 200 x 200 ft., with two-story office and operating building adjoining, 25 x 200 ft., on East 220th Street, near Chardon Road. Cost over \$150,000 with equipment. Present plant will be removed to new location and capacity increased. Harry A. Fulton, 5617 Euclid Avenue, is architect.

Wellman Bronze & Aluminum Co., 6017 Superior Avenue, Cleveland, castings, bearings, bushings, etc., will carry out expansion for production of steel, brass and aluminum tubing for Government, which has authorized fund of \$194,221 through Defense Plant Corp., Federal agency, for project. Company is erecting one-story addition, 65 x 115 ft., recently noted, for use in conjunction with expansion noted. Frank Haushka, Ninth-Chester Building, is architect.

Galion Metallic Vault Co., Galion, Ohio, steel vaults, etc., has let general contract to Schirmer-Schneider Co., 2729 Prospect Avenue, for one-story addition, 50 x 600 ft. Cost close to \$150,000 with equipment. Althouse & Jones, Farmers' Bank Building, Mansfield, Ohio, are architects.

Cincinnati Shaper Co., Hopple and Gerrard Streets, Cincinnati, machine tools and parts, will proceed with superstructure for one-story addition, 96 x 150 ft. Cost over \$85,000 with equipment. Fosdick & Hilmer, Union Trust Building, are architects and engineers.

Kinnear Mfg. Co., Seventh Street and Fields Avenue, Columbus, Ohio, rolling steel doors, partitions, etc., has let general contract to E. Elford & Son, Inc., 555 South Front Street, for one-story addition, 100 x 100 ft., for storage and distribution.

Productive Plating Works, Inc., Lebanon, Ohio, metal plated products, has asked bids on general contract for one-story addition. Cost close to \$50,000 with equipment. Carl J. Kiefer, Schmidt Building, Cincinnati, is consulting engineer.

Board of Public Works, City Hall, Anderson, Ind., plans new boiler plant for municipal waterworks station, with installation of boiler unit and auxiliary equipment. Bids will be asked soon. Russell B. Moore & Co., 1456 North Delaware Street, Indianapolis, are consulting engineers.

Production Tool & Supply Co., 2832 Easton Avenue, St. Louis, tools, etc., has approved plans for one and two-story addition, with first floor, 25 x 110 ft., and second floor about 25 x 60 ft. Cost close to \$50,000 with equipment.

McCabe Powers Auto Body Co., 5900 North Broadway, St. Louis, automobile bodies and parts, has let general contract to Fruin-Colnon Contracting Co., Merchants Laclede Building, for one-story addition, 75 x 130 ft. Cost over \$70,000 with equipment.

Board of Education, Coffeyville, Kan., will

take bids soon on general contract for one and two-story and basement trade and vocational school, 150 x 275 ft. Bond issue of \$232,000 has been authorized for project. Glen H. Thomas, 125½ North Topeka Street, Wichita, Kan., is architect.

Dart Truck Co., Oak and Twenty-seventh Streets, Kansas City, Mo., has asked bids on general contract for one-story addition, 112 x 130 ft. Cost close to \$100,000 with equipment. Robert J. Raney, Union Station Building, is architect.

Kansas Elevator Co., Curtis and North Monroe Streets, Topeka, Kan., has let general contract to J. M. Jack Construction Co., Food Terminal Building, Kansas City, Mo., for new grain elevator, about 250,000 bu. capacity. Cost over \$85,000 with elevating, conveying, screening and other equipment. Horner & Wyatt, Board of Trade Building, Kansas City, Mo., are consulting engineers.

McCord Radiator & Mfg. Co., 2587 East Grand Boulevard, Detroit, automobile radiators, air-conditioning equipment, etc., has let general contract to Cunningham-Rudy Co., Detroit, for new two-story plant at Wyandotte, Mich. Cost over \$75,000 with equipment.

Federal Mogul Corp., 11031 Shoemaker Street, Detroit, bushings, bearings, castings, etc., has let general contract to W. J. C. Kaufmann Co., 10610 Shoemaker Street, for one-story addition, for expansion in foundry. Cost over \$50,000 with equipment.

Chevrolet Motor Division, General Motors Corp., Flint, Mich., has let general contract to H. G. Christman-Lansing Co., Kalamazoo Plaza, Lansing, Mich., for five one-story additions to plant used for sheet metal stamping and other operations, totaling about 76,000 sq. ft. additional floor space. Cost about \$400,000 with equipment.

Lobdell-Emery Co., Alma, Mich., bicycle rims and other light metal products, plans one-story addition. Cost close to \$50,000 with equipment.

Gunitite Foundries Corp., Peoples Avenue, Rockford, Ill., iron castings, brake drums and kindred equipment, has let general contract to Security Building Co., 717 East Jefferson Street, for one-story foundry addition, 100 x 160 ft. Cost over \$75,000 with equipment.

Borg-Warner Corp., Spring Division, Bellwood, Ill., has let general contract to Enjay Construction Co., 160 North LaSalle Street, Chicago, for one and two-story addition, 200 x 200 ft., for automobile springs and allied production. Cost over \$200,000 with equipment. Howard F. Colburn, 160 North LaSalle Street, Chicago, is architect. Main offices are at 310 South Michigan Avenue, Chicago.

American Lubra Gas Corp., Rockford, Ill., oil and gasoline, has let general contract to H. S. Holtze Construction Co., 2121 East Fourth Street, Sioux City, Iowa, for new oil refinery at Sioux City. Cost over \$125,000 with equipment.

Cutler-Hammer, Inc., 4107 West Orchard Street, Milwaukee, electric switches, controls and allied electrical equipment, has let general contract to H. Schmitt & Son, Inc., 930 East Burleigh Street, for one-story addition, 80 x 90 ft. Cost close to \$50,000 with equipment. Keymar & Slaby, 2209 North Sixty-ninth Street, are architects.

Wrought Washer Mfg. Co., 2100 South Bay Street, Milwaukee, has let general contract to Klug & Smith Co., 111 East Wisconsin Avenue, for one-story addition, 160 x 260 ft., for storage and distribution. Cost over \$70,000 with equipment.

Board of Heat Commissioners, Sleepy Eye, Minn., asks bids until May 1 for steam-driven vacuum pumping unit and auxiliary equipment for municipal power and heating plant. Rose & Harris, Essex Building, Minneapolis, Minn., are consulting engineers.

Signode Steel Strapping Co., 2600 North Western Avenue, Chicago, steel strapping and allied steel specialties, has let general contract to S. A. Awsumb, 5732 North Wayne Avenue, for two-story addition, 100 x 140 ft., for storage and distribution. Cost about \$75,000 with equipment. Wright & Stromberg, 140 South Dearborn Street, are architects.

Western States

• **Schlage Lock Co.**, 20 Blanken Avenue, San Francisco, locks and builders' hardware, has let general contract to Cahill Brothers, 296 Sansome Street, for one-story addition. Cost close to \$50,000 with equipment. W. Adrian, 417 Market Street, is consulting engineer.

Norris Stamping & Mfg. Co., 960 East Sixty-first Street, Los Angeles, sheet metal stampings, dies, etc., has let general contract to Alco Construction Co., 5423 Flemish Village Lane, for one-story plant unit on neighboring site, 128 x 640 ft., and one-story extension to present plant, 120 x 140 ft. Cost over \$500,000 with equipment. Webber & Co., Hollingsworth Building, are architects.

Willamette Iron & Steel Corp., North West Front Street, Portland, paper mill and sawmill machinery and parts, will carry out plant expansion, including additional machinery, for production of equipment for Government. Cost about \$542,000. Appropriation in that amount is being secured through Defense Plant Corp., Washington, Federal agency.

Galvanizers, Inc., N. W. Thirtieth Avenue, near Yeon Street, Portland, Ore., David B. Seger, president, has let general contract to A. J. Bingham & Son, Couch Building, for new one-story plant, 50 x 135 ft., for production of galvanized steel shapes, plates, etc., for ship construction. Cost close to \$80,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until April 29 for one motor-driven, bench-type precision lathe for San Diego, Cal., naval air station (Schedule 6294).

Federated Metals Division, American Smelting & Refining Co., 170 West Massachusetts Avenue, Seattle, has awarded contract to Austin Co., Cleveland, for design and construction of new one-story plant at Dakota Street and First Avenue South. Cost close to \$75,000 with equipment. Main offices are at 120 Broadway, New York.

Lake Washington Shipyards, Inc., Seattle, has let general contract to Atherton Construction Co., Terminal Sales Building, for expansion in Houghton shipbuilding plant, near Seattle, including new shipway, docks and one-story shops. Cost about \$250,000 exclusive of equipment.

Canada

• **DeHavilland Aircraft of Canada, Ltd.**, Sheppard Avenue, Toronto, has awarded general contract to A. W. Robertson, Ltd., 57 Bloor Street West, for one-story addition for expansion in parts and assembling divisions. Cost close to \$500,000 with equipment.

Wall Chemicals Canadian Corp., 5726 St. Denis Street, Montreal, plans new one-story plant at Cote St. Paul, near Montreal, for production of acetylene gas, industrial oxygen and allied products. Cost over \$160,000 with equipment. T. Pringle & Son, Ltd., 465 McGill Street, is architect and engineer.

Kelvinator of Canada, Ltd., 1152 Dundas Street East, London, Ont., electric refrigerators and parts, plans one-story addition, 40 x 200 ft. Cost over \$100,000 with equipment.

Dominion Wheel & Foundries, Ltd., 171 Eastern Avenue, Toronto, plans two-story addition for expansion in machine shops. Cost over \$85,000 with equipment. Proctor, James & Redfern, Excelsior Life Building, are engineers.

Western Foundry Co., Wingham, Ont., had recent fire with loss of \$50,000. Company was working on war orders and plans to rebuild immediately.

Canadian National Railways, 360 McGill Street, Montreal, S. J. Hungerford, president, has taken bids for superstructure in connection with \$4,000,000 terminal.

Procter & Gamble Co. of Canada, Ltd., Burlington Street East, Hamilton, Ont., has awarded contract to W. H. Cooper Construction Co., Ltd., Medical Arts Building, for a boiler house to cost \$75,000.

American Can Co., Ltd., Medical Arts Building, Hamilton, Ont., has awarded contract to W. H. Cooper Construction Co., Ltd., for a plant addition to cost \$50,000.